THE HEATING AND VENTILATING MAGAZINE

OL. VII., No. 1 NEW YORK, JANUARY, 1910 $1.00 a year, 10 cents a copy

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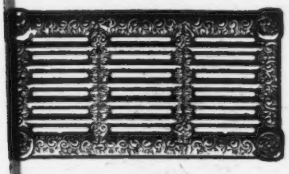

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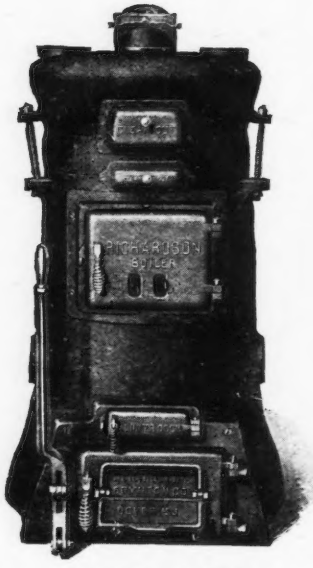

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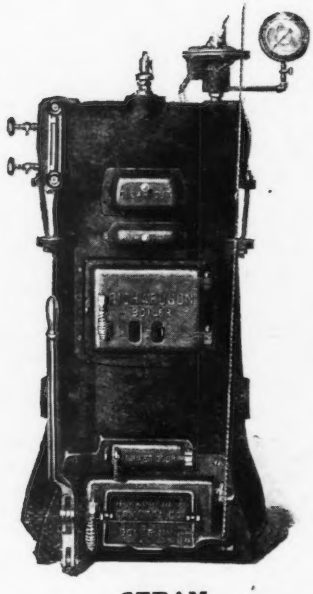

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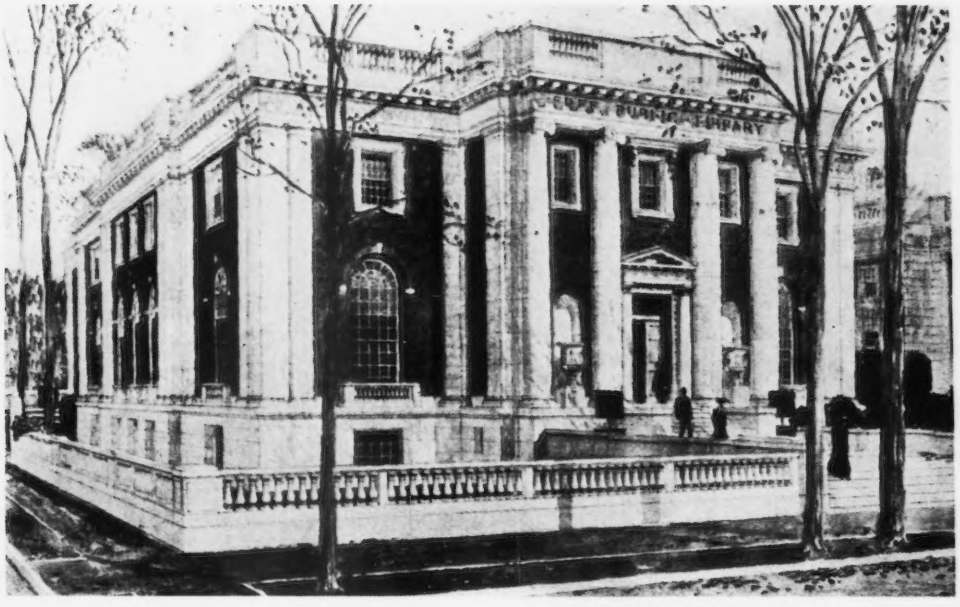


NEW HAVEN FREE PUBLIC LIBRARY, IVES MEMORIAL

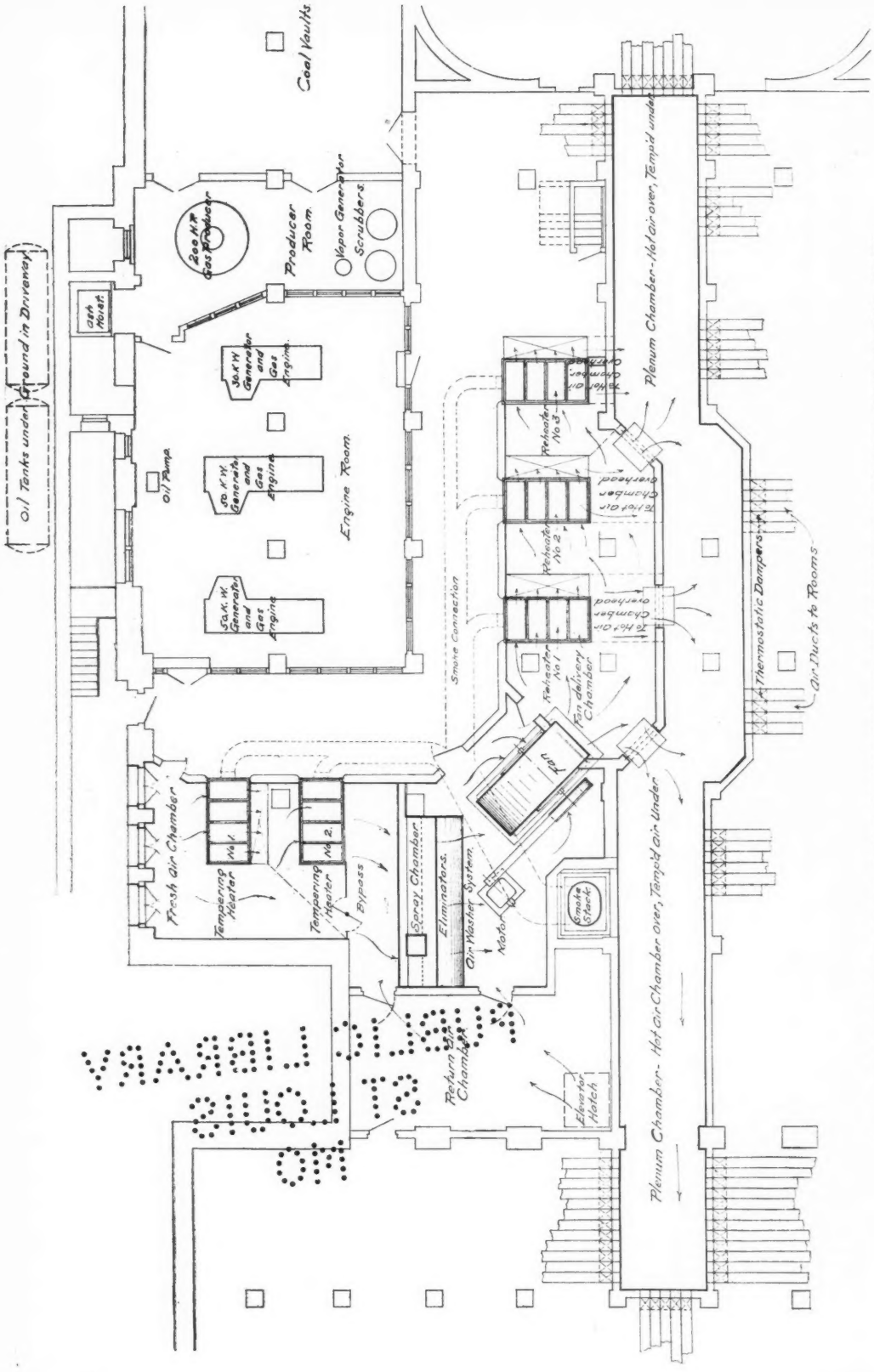
Use of Exhaust Heat from Gas Engines for Heating Buildings

A Novel System for the Ives Memorial Library, New Haven, Conn.

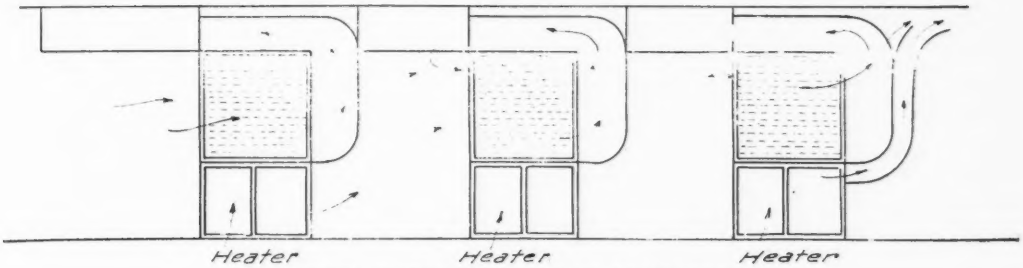
With the increasing use of producer gas in the mechanical equipments of buildings, for operating gas engines, the matter of utilizing the waste heat from the engines has an important bearing upon the economy of the cost of operation. The solution of the problem illustrated in the accompanying drawings has a number of interesting features of general application.

The plant illustrated is that designed for the Ives Memorial Library building, New Haven, Conn., by Burt S. Harrison, of New York. The idea is to take the exhaust heat from the gas engines and carry it to the heating apparatus, where it supplements the heat of the regular fuel. While it is the intention to install the plant as laid out, it should be stated that at present the gas producers and gas engines have been omitted, electric current for the motors, etc., being taken from the New Haven Electric Co.

A reference to the drawings will



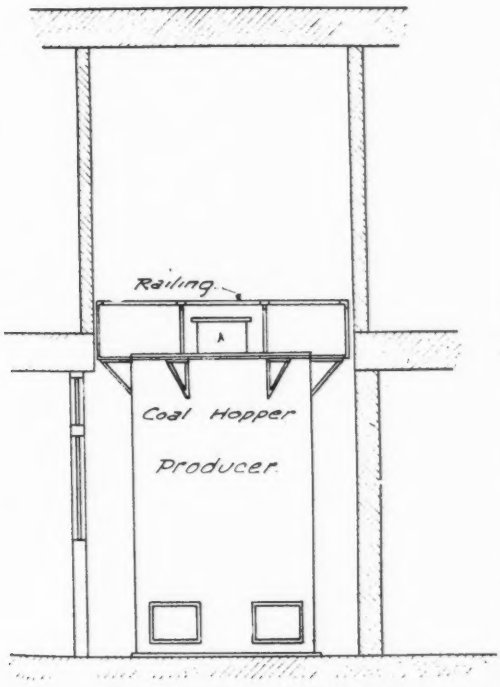
HEATING AND VENTILATING PLANT DESIGNED FOR IVES MEMORIAL LIBRARY, NEW HAVEN, CONN.



SECTION THROUGH GROUP OF REHEATERS

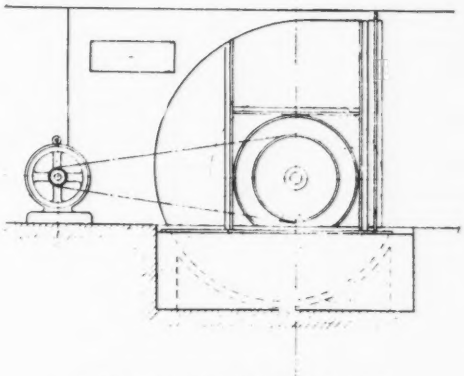
show the general design of the system. A fan having a wheel 8 ft. x 4 ft., operated by a 15 H.P. direct current motor belted, has a capacity of 40,000 cu. ft. of air per min. The air, after passing through two tempering air tube heaters, is purified by a Peerless air washer and reheated in three air tube heaters. Both the tempering and reheating units are of the Harrison air tube type made by the Harrison Engineering Co.

A pressure chamber system of air distribution is employed, with thermostatically-controlled mixing dampers at the plenum chamber, which occupies the central portion of the basement. Air from the building can be recirculated through corridors and elevator shaft to the apparatus room.



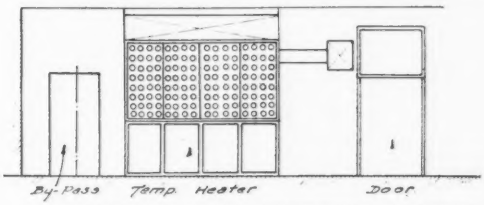
ELEVATION OF PRODUCER

The gas producers provided for in the plant are designed to operate gas engine driven generators, the exhaust from the gas engines to be used as stated, in the air tube heaters. Make-up heat for the heaters is provided by means of fuel oil. The oil storage



SECTION THROUGH BLOWER

tanks are designed to be buried underground in the roadway. The grates of the heater, however, are equipped so



SECTION THROUGH TEMPERING HEATER NO. 2

that either coal or oil can be used for fuel.

To prevent the accumulation of frost or moisture on the inside of store windows in cold weather, due to the difference in temperature between opposite sides of the glass, a Pennsylvanian has invented a ventilating device which admits cold air through small holes above the glass and deflects it down the surface.

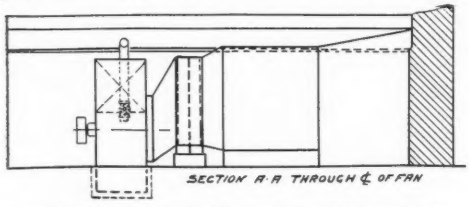
Use of Humidifiers in a Cold Climate

Heating and Ventilation of American Optical Company's Administration Building at Southbridge, Mass.

The plant of the American Optical Company, at Southbridge, Mass., is located at a point where intense cold is experienced during portions of the winter season. Several years ago the company undertook the erection of a modern administration building. They had learned from experience that the blower system of heating and ventilation cannot overcome the objectionable low humidity of that locality without an auxiliary apparatus. This condition, they found, could be remedied by using an air washer and humidifier, while at the same time they could get cleaned air, two items of vital importance.

Their first venture in this direction was not entirely satisfactory, as the apparatus used was an early and unperfected type. After five years the company decided to dispose of the original outfit and install a new one entirely adequate to their wants. That the humidity could be controlled within a few per cent. had hardly occurred to them, although the present machine is doing precisely that.

The general arrangement of the apparatus is similar to an ordinary blower heating system with double ducts, with an air washer and humidifier attached to the intake. The fan and heaters are of the Buffalo Forge Company's make and are arranged as shown in the illustration. The air washer was made by the Carrier Air Conditioning Company. The 110-in. three-quarter housed blower delivers approximately 23,000 cu. ft. of air per min-

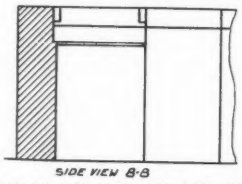


SECTION ON A-A OF AIR WASHER, TEMPERING COILS AND FAN

ute at a speed of 220 R. P. M. This quantity shows a velocity of a little over 500 ft. per min. through the air washer. The coils containing 4,300 lin. ft. in the heater and 1,700 lin. ft. in the tempering coils, are of the miter type and use hot water at 180° F. maximum temperature.

The fresh air is drawn from a court yard through the washer, where it receives from the tempered water its initial heating. The leaving temperature depends on the dew point desired, or in other words, on the relative humidity desired to be maintained in the building.

After leaving the eliminator plates, where the unevaporated particles of dust-laden moisture are caught, the air, now saturated, goes through a tempering coil to the fan and then to the heating coils, where the temperature is raised to about 120°, at which it is discharged through underground ducts, leading to vertical risers. Part of the air, however, by-passes the heating coils and is carried by the lower duct of the double duct system, and is at a temperature of approximately 70°. This allows a close temperature regulation by thermostatic control, as the hot and tempered air ducts are supplied with dampers set at right angles to each other and operated by compressed air diaphragms.



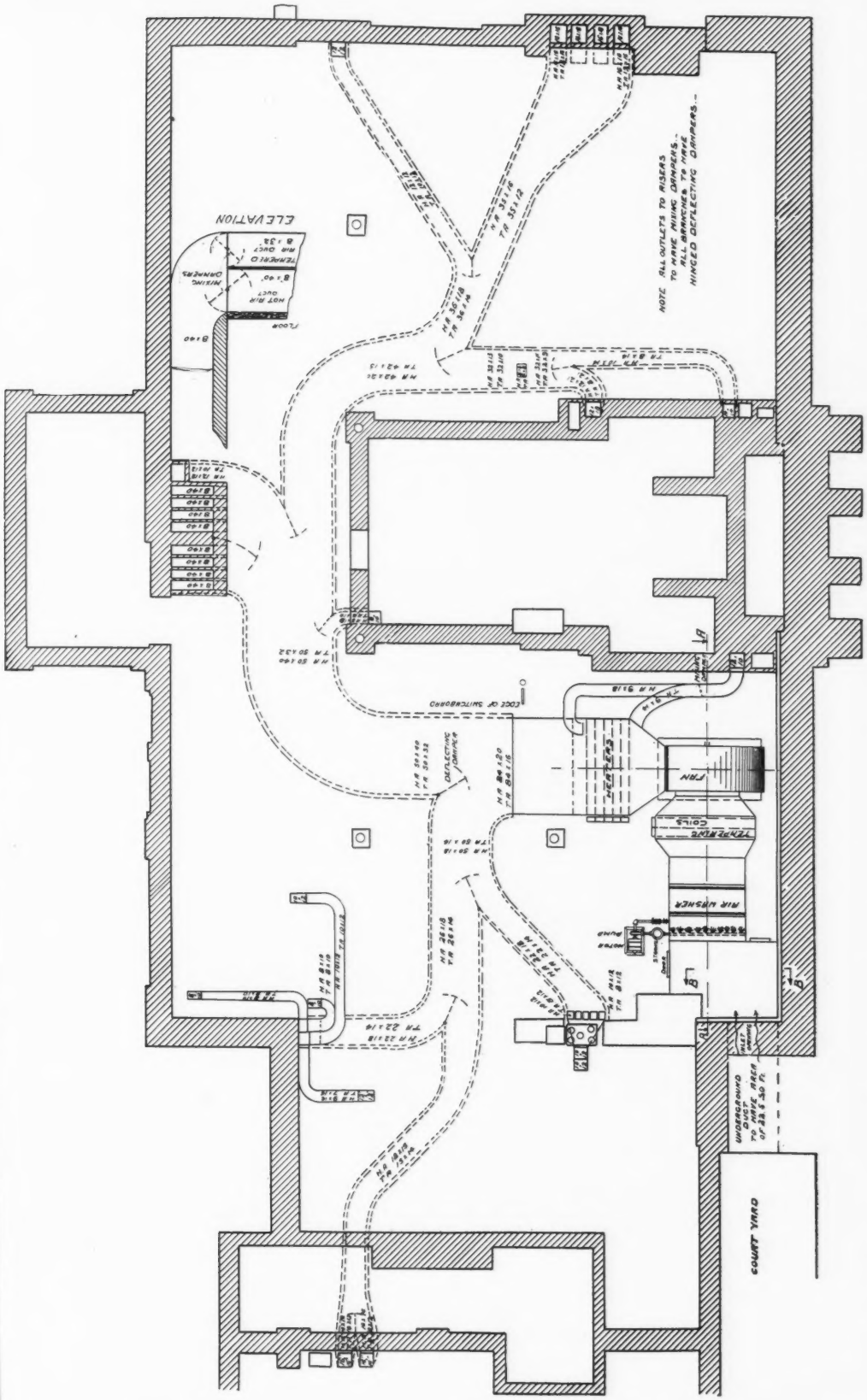
SECTION ON B-B OF AIR INLET

To obtain the results in the air washer, the spray water is heated by an ejector type of water heater placed on the suction line of the pump. This heater is connected to a 20-lb. pressure steam line having a thermostatic controlled diaphragm valve. The thermostat is placed just past the eliminators and is set at the temperature which will give the air the amount of moisture desired in the building. Obviously this is accomplished by a variable water temperature on account of the changes in the outdoor weather.

Incoming air at zero and 50% humidity contains approximately 0.25 grains of moisture per cubic foot. At 50° this air is capable of carrying 4.08 grains, and the difference must be supplied, the latent heat for this evaporation being taken from the heated water. At the same time any suspended matter in the air is removed. After the spray water has done its work it falls to the receiving tank and is recirculated by the motor-driven centrifugal pump. The dirt is removed from the water by a fine mesh copper screen placed between the tank proper and the suction end.

About once a week this tank is drained off, and during that period about several pails full of dirt will have accumulated. After carefully flushing out, the fresh water connection is opened up and new water fills the tank. The fresh water supply is fitted with a ball cock, so that a constant level of water is maintained, as the continuous evaporation requires compensation.

The temperature within the building is automatically kept at 70° and a relative humidity of 50%, and an abundant supply of air free from germs and foreign matter.



HEATING AND VENTILATING SYSTEM FOR ADMINISTRATION BUILDING, AMERICAN OPTICAL COMPANY, SOUTHBRIDGE, MASS.

Proposed New Ventilation Methods for Chicago's Public Schools

By W. A. Evans,

COMMISSIONER OF HEALTH OF CHICAGO

Editor's Note.—The buildings and grounds committee of the Chicago Board of Education has adopted a new type of building after which all future school edifices will be constructed. Mr. Evans's article, which appeared in the December, 1909, issue of the "Educational Bi-Monthly," published by the Board of Education of Chicago, is in condemnation of the present "down draft" type of ventilation and a plea for its elimination in future school construction.

Roughly speaking, every child between six and sixteen years of age spends six hours out of each twenty-four for five days of the seven, for ten months of the twelve, in the school room.

The years represent the most important of the child's life. He goes in a little over 3 ft. high and weighing about 50 lbs.; he comes out nearly 6 ft. high and weighing 125 lbs.

If the ventilation is not good, several things may happen to children: First, they contract some form of air-bone infection; second, they become pale and lifeless; third, they get headaches; fourth, they become nervous. All of these last suffer both in their physical and mental development, ordinarily.

There are certain principles of ventilation which should be adhered to. No system should ever be adopted which prevents the rooms from being thrown open and aired several times each day. This airing should be by volumes of cold, fresh air directly introduced in strong, blowing currents. A good descriptive phrase is to give the room a good blowing out. We know that a consumptive will do much better in the open where the wind will blow directly over him than he will in a room with the windows thrown full up. Maybe the effect of the strong draft is to blow away harmful chemicals and bacteria. Maybe the better effect is due to oxygen rendered nascent and with bonds made active by the electricity generated by friction.

The inlets and exits for air should be so arranged as to permit of only smallest degree of admixture of the foul and the fresh air. It is not alone that the foul air is full of C O_2 and other excretory gaseous substances, but that it contains a bacterial flora which should be led out of the breathing zone as rapidly as possible. The bacetria which one child has coughed sneezed, or even breathed out should be lifted as rapidly as possible above the breathing zone of the other children.

Another factor of great importance, according to Pflügge, is that the air which has been warmed by contact with the interior of the lungs or the exterior of the body is very harmful when kept in contact with the body.

Another factor of less importance is economy. If you are to furnish 3,000 cu. ft. of air each hour to each of 60 children and the outside temperature is 10° above zero, a great deal of heat will be required. These children, relatively inactive physically and not warmly clothed, will not be able to contribute much heat to warm the air. This large volume of air will not be required if the principle of dilution is abandoned and the principle of direct removal is striven for. When a smaller volume of air is required per pupil, not only is there a saving in heating but there is also a diminution of the force with which the air s delivered in the room.

The heating should be by radiators. In a schoolroom the air as introduced should be heated enough not to feel cold as it strikes the pupils. The remaining requirements of heating should be supplied by coils. The air should be introduced under the seats through ducts having many openings. The exits should be at the ceiling. This, of course, applies only to those few months when the windows cannot be used for ventilation.

The Validity of Vacuum Heating Patents

A Statement to the Members of The National Association of Master Steam and Hot Water Fitters, Issued by Warren Webster & Company

Under date of December, 1909, Warren Webster & Co., of Camden, N. J., have published what constitutes a reply to the recent pamphlet issued by the National Association of Master Steam and Hot Water Fitters, in which the validity of important vacuum heating patents was questioned. In the announcement published by the master fitters' association, the statement was made that "the basis of doing business will be materially changed by owners of some of the alleged vacuum (heating) patents," and that "some of the manufacturers of vacuum (heating) specialties believe with us that 'time is up' on royalty charges."

The statement of Warren Webster & Co. opens with a review of their participation in the investigation conducted by the master fitters' association, through its committee on trade relations. The letter is reproduced, written by the company, under date of June 12, 1909, to Mr. P. Gormly, at that time chairman of this committee, stating the company's position, to which was added a list of the patents owned or controlled by Warren Webster & Co., together with the opinions of three firms of attorneys, upholding their validity.

The statement then proceeds to reproduce letters from the same attorneys to whom the pamphlet of the master fitters was submitted for their consideration and opinions.

FACTS CITED BY MR. CHAMBERS LONG KNOWN

An opinion, dated December 16, 1909, was received from Kenyon & Wall, of New York. After stating that they have read with great care the statement issued by the National Association of Master Steam and Hot Water Fitters in relation to the Skiffington and Paul patents and also the opinion of the association's attorney, Mr. Francis T. Chambers, they declare that the opinion previously given that the Skiffington and Paul patents are valid is strongly supported and confirmed by what is found in the association's document.

"Mr. Chambers," continues the letter, "has evidently made a most exhaustive search in prior patents and the prior art, and this has been supplemented by extensive investigations made by the Board of Directors themselves; and yet nothing new has been discovered which in any way affects the validity or scope of the Skiffington and Paul patents in question. All of the patents referred to by Mr. Chambers, and the facts mentioned by him, have been known to the public for many years, and have been cited in the answers filed in suits which have been brought under these patents, and yet such defendants have not had confidence enough in these defenses to continue such suits, but have in the end conceded the correctness of our contention and settled the same."

"I personally had charge," continues the writer, Mr. Robert N. Kenyon, "of prosecuting the applications for these patents in the U. S. Patent Office. All of the important facts relied upon by Mr. Chambers as forming the basis of his opinion were known to the Patent Office at the time these applications were prosecuted, and yet the patents were granted, and their validity has been practically acquiesced in by the public for fifteen years.

"The gist of the whole matter is this. Skiffington brought together in a heating system certain devices or elements in a new combination. The elements separately considered were old, but the combination was new. Under our law a new combination is patentable even though all the elements are old separately considered.

"Mr. Chambers in his opinion points out that a reducing valve was old, and that a pump was old, and that each of the other elements was old and well known, and he then expresses his opinion that in combining them together Skiffington showed 'no quality of invention' or 'no inventive thought,' and he says the same of Mr. Paul.

"This is in reality an admission that Mr. Chambers does not find these combinations to be old in the art, for if he did the question whether Mr. Skiffington or Mr. Paul had shown any invention or any inventive thought, would not arise, and it would not have been necessary for Mr. Chambers to express any view on that subject.

"I would add in this connection that I differ radically from Mr. Chambers on this point. The question whether a new combination involves invention is always a difficult one to decide, but in a case of doubt the courts are generally controlled by the consideration of what the invention has actually accomplished in the art. In view of the beneficial results secured by the Skiffington and Paul combinations and methods, and their extensive adoption by the public, I do not believe the courts would agree with Mr. Chambers.

"In reference to the Hussey & McCann patent No. 524,110, I note with interest that it appears from Mr. Chambers' opinion that the method of controlling the vacuum pump in a heating system covered by the Hussey & McCann patent is new and was not known in the prior art. Here again Mr. Chambers merely expresses his individual opinion that this combination did not involve invention,

but the Board of Governors of the association evidently do not agree with him, for they advise their members not to use this method of control.

"In speaking of Paul patent No. 604,335 of 1898, Mr. Chambers states that he is not prepared to give his opinion as to the validity of this patent because he 'would probably require expert advice before doing so.' The fact that Mr. Chambers, approaching these patents in an attitude of hostility, as he does, finds himself unwilling to say that the patent is invalid, is a striking confirmation of the opinion that I have expressed that the patent would be sustained.

"Furthermore, I believe that if Mr. Chambers had had the benefit of the 'expert advice' to which he refers, and of long practical experience in the art, his views as to the validity of the other patents might have been materially altered.

"Mr. Chambers does not pretend to pass upon the validity of the many patents for return valves and other devices which are owned by you and the other licensees under the Skiffington and Paul patents. I would simply say in this connection that I believe that many of the forms of return valves that are being offered by other parties to the steam fitters are infringements of one or more of these return valve patents, and that the use of such valves in the combinations contemplated, would infringe these valve patents as well as the Skiffington and Paul system and combination patents.

"In conclusion I would say that this statement which has been issued to the master fitters, simply strengthens and confirms the opinion that I expressed to you in my letter of July 3, 1909, in which I said:

" 'This Skiffington patent, by removing the air and water of condensation in the manner described in the patents, and by supplying the steam in a measured and regulated amount, provides an ideal method of steam circulation, and secures a degree and accuracy of control and flexibility and economy that were new in the art, and that marked a decided step in advance.

" 'In view of the novelty and value of the inventions, we are confident that the patents are valid and will be sustained by the courts should any further litigation arise.' "

OPINIONS OF OTHER ATTORNEYS

The opinions of the other two firms of attorneys confirm the views expressed by Kenyon & Kenyon. In a letter received from Parker & Carter, attorneys of Chicago, the writer, Donald M. Carter, states that "my study of the prior art and of the patents upon which Mr. Chambers renders an opinion has convinced me, not only that they are valid and cover the construction referred to in Mr. Chambers' opinion, but that they embody an important advance in the art to which they pertain.

"The committee has, it may be more or less unconsciously, acquiesced in the truth of what I have herein stated, namely, that the opinion of the man who is simply looking at the patent from the standpoint of tearing it down is not to be accepted unreservedly and is liable to be wrong, because it has refused to accept Mr. Chambers' opinion as he has rendered it, and has advised caution, and has stated that certain constructions should not be installed, and it has done this in spite of the fact that in Mr. Chambers' opinion there is no warning or suggestion of caution, or statement that any particular construction should be excluded.

"Another fact that which probably influenced the committee in the matter of caution is that no man who has had experience with the lawsuits ever believes there is no danger from a suit founded on a patent."

In the third opinion received, written by R. M. Hunter, of R. M. Hunter & E. H. Hunter, patent attorneys of Philadelphia, under date of December 26, 1909, the writer states that "the conclusion which I draw from the statement as a whole, is that it is incorrect in many respects; and while it is full of generalities, insinuating lack of invention in the Skiffington, Paul and other patents, it is well furnished with wholesome 'Cautions' to its members, which indicate very clearly that the framers of the statement lacked confidence in their own opinions and that of their attorney.

"I would point out that while Mr. Chambers presumes to advise the master fitters that they may use any of the apparatus shown in the blue print annexed to his opinion, he undoubtedly lacks proper information, because the separating tank devices and connections therewith for taking care of the condensation water are, in my opinion, covered by other patents and pending applications owned by you; further, the 'pump governor' is operated by a vacuum connection, and the directors in their 'statement' cautions the members against infringement by using such a connection.

"Mr. Chambers' opinion, that the Skiffington patent, if valid, should be limited to the use of a vacuum air line as distinguished from a return for air and water, is without force. I have made careful tests of the air line systems and have found that large volumes of water were always present with the air.

"Mr. Chambers has much to say about the reducing valve controlling the steam to just what is necessary for full condensing capacity of the radiators, but that, as a matter of fact, demonstrates that he evidently does not fully comprehend the Skiffington invention. His opinion is largely an attempt to show that

the different elements per se are old, but he fails to anticipate the combination required. He refers specifically to the Hall car heater patent as an anticipation, but it does not anticipate, because it does not have a reducing valve operating independently of the radiator or temperature of the car and because it does not have automatic valves on the returns.

"The Hardingham English patent of 1885, referred to in the statement, is inoperative. Air would be forced into the system with the steam. The check valves on the radiators cannot operate to permit the air to be withdrawn from the radiators. Instead of anticipating, this patent is for an inoperative device.

"As I was attorney for the pioneer Williames patent of 1882 and have been closely identified in the vacuum steam heating litigation for the past 25 years, I feel that I can express an opinion upon these subjects with some confidence. The statement of the National Association, when divested of its ambiguities and generalities, does not produce a particle of evidence which nullifies your claims to the broad scope of the Skiffington and Paul patents. On the other hand, it is pervaded with 'caution' signals to its members, which supports your contention of the validity of the patents."

The Future of Producer Gas in Heating Work

By J. M. W. Kitchen

There can be no question that the very highest ideal in connection with heating processes is the generation and distribution of a fuel gas from central generating stations.

When we consider how very cheaply producer gas can be manufactured, it seems very reasonable to conclude that the use of this gas should in the future be widespread; but as a matter of fact, there is a very decided limitation to the possibilities of this use, owing to the very small proportion of heat units in what is known as "producer gas"; that is, gas which has at least 60% of nitrogen, and the heating elements of which are of an extremely light and bulky nature. The very quality in producer gas which makes it so fine and low cost a fuel for the internal combustion engine, stands in its way as a conveyor of heat units. For certain heating operations in the arts, where a clean smokeless combustion is required, and where the gas can be burned under special conditions of pressure, both as to the gas itself and the air used in burning the gas, astonishingly satisfactory results can be secured, both technically and in the greatly reduced cost of fuel.

In certain isolated plants of moderate size, this fuel can also be used through its distribution and burning in heating appliance, and for domestic cooking, as well as for generating motive power, operating domestic utilities, or for other purposes.

But when we come to distributing a fuel gas for larger districts, for various reasons, such as economy in the distributing conduits, in the size of gas holders, as well as in actual heating results, a richer gas and one freer from unburnable constituents seems to be the only available possibility. However, through the application of various economizing methods, a fuel gas of satisfactory character can be probably manufactured and sold for from one-half to one-third the present price of illuminating gas, and it would seem that at least in cities burdened by the smoke nuisance, the existence of this fact should lead to an almost exclusive use of a fuel gas for heating.

PRODUCER GAS OF USE IN LARGE INSTALLATIONS ONLY

I consider that there is absolutely no sphere for producer gas heating in small installations; for, after all, there is only a certain amount of concentrated heat energy in fuel, and when large volumes of heat are to be merely transferred to a heating medium, the method through which that transfer can be made in the simplest and most economical manner is the best method to pursue. It is true that by using a producer gas generator for producing the gas, and a gas engine for burning the gas, we secure a practically perfect gasification of the fuel and perfect burning of the gas. But on the other hand, with approved methods, it is practically possible to secure a substantially perfect combustion of the fuel and an almost complete transfer of the heat generated to the heat distributing medium.

So, if we merely consider the feasibility of using producer gas for heating, we must conclude that there is a very limited field for its use.

But, when we also consider that along with convenient economical methods of heating, we have an almost equal demand for concentrated energy for power and lighting through the use of the electric current, we at once come into a new field for the use of producer gas. There is no question that in the future and for many years to come producer gas will be the basis for the generation of two-thirds of the motive power used. Its cheapness

as compared with steam power is astonishing. But this gas power has its limitations. Among these limitations is the fact that there is so little concentrated heat in the gas itself, and hence there is little chance of increasing the efficiency of the internal combustion engine itself to any great degree. Notwithstanding the fact that with equal fuel values nearly eight times the motive force is generated from the internal combustion engine as is generated in steam generation, still two-thirds of the heat of the gas engine escapes in the jacket water and the exhaust gases of the gas engine. Now, it is easily practicable to economize all this heat in heating water to a point that is sufficiently high for ordinary heating purposes, and by the auxiliary heating of the water to generate steam for either power purposes or heating.

NATIONAL ASSOCIATION OF MASTER STEAM AND HOT WATER FITTERS

Next Annual Convention at Atlantic City in June, 1910

It has been learned that the next annual convention of the National Association of Master Steam and Hot Water Fitters will be held at Atlantic City, N. J., some time in June, 1910.

Fifth Annual Banquet of Newark Local Association

The Newark Association's recent annual banquet at Davis's Restaurant, December 8, was a highly successful affair, being attended by fully 100 members and guests of the association. The National Association was represented by Vice-President Edward B. Denny and Secretary Henry B. Gombers. President Charles A. Geoghegan, who expected to be present, was detained by illness. There were no set addresses, but entertainment was furnished by a number of vaudeville artists.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

Programme for the Annual Meeting

Following is the programme of the annual meeting of the American Society of Heating and Ventilating Engineers, Engineering Societies Building, January 18-20, 1910:

Tuesday Afternoon, Jan. 18, 2 o'Clock

Business session.

Tuesday Evening, Jan. 18, 8 o'Clock

Report of tellers.

Report of Committee on Air Washers. S. R. Lewis, chairman.

Report of Committee on Standards with Reference to House Heating Boiler Ratings. J. H. Kinealy, chairman.

Report of Special Review Meeting Committee on Heating Boilers. P. H. Seward, chairman.

TOPICS FOR DISCUSSION

1. Methods for testing house heating boilers to get the most accurate data.
2. The influence of low pressure or vapor vacuum systems towards lifting water from boilers to mains and radiators.

Wednesday Afternoon, Jan. 19, 2 o'Clock

Paper, "A Method of Determining the Sizes of the Pipes of a Hot Water Apparatus," by J. Jeffreys, London, England.

Reports of Special Review Meeting Committees:

"Hot Water Heating," W. M. Mackay, chairman.

"Steam Heating Small Buildings," Charles F. Newport, chairman.

"Furnace Heating," James D. Hoffman, chairman.

TOPICS FOR DISCUSSION

3. The amount of water to be evaporated to maintain a proper humidity in a home in zero weather.
4. The proper method of determining the sizes of mains in heating systems using a forced circulation of hot water.

Wednesday Evening, Jan. 19, 7:30 o'Clock

Annual reception and dinner at the New Grand Hotel, Broadway and Thirty-first street.

Thursday Morning, Jan. 20, 10:30 o'Clock

Paper, "Performance of Heating Guarantees," by William Kent.

Reports of Special Review Meeting Committees:

"Tests," D. D. Kimball, chairman.

"Standards," R. C. Carpenter, chairman.

"Fans and Fan Systems," B. S. Harrison, chairman.

"Radiators and Heaters," W. W. Macon, chairman.

TOPICS FOR DISCUSSION

5. The relative efficiency of exhaust and live steam in heating.
6. The duty of the members to the society's committees.
7. The recognition of the heating and ventilating engineer by those requiring his services.
8. Safeguarding the profession.
9. Endowments for the society to further its work in the interest of the public.

Thursday Afternoon, Jan. 20, 2 o'Clock

Paper, "Variability of Interior Conditions in School Rooms," by H. W. Whitten.

Installation of officers.

Reports of Special Review Meeting Committees:

"Compulsory Legislation," John F. Hale, chairman.

"Ventilation," Thomas Barwick, chairman.

"Central Heating Plants," John R. Allen, chairman.

"Electric Heating," T. N. Thomson, chairman.

"Steam Heating for Large Buildings," John F. Hale, chairman.

TOPICS FOR DISCUSSION

10. The objection to placing dampers in heat and vent flues of a fan system reducing their area.
11. The relative efficiency of 180° hot water systems, 2-lb. gravity steam, steam below atmosphere, without mechanical appliances, furnace with outside air supply, furnace with inside and outside air supply, furnace with air supply from each room, furnace with fan, and pressure and vacuum steam with fan, and wrought and cast iron blast heaters.
12. The relative cost of operating vacuum systems of exhaust steam heating per 1,000 sq. ft. of direct radiation with 5, 10, 15 and 20 in. of vacuum.

Newly Elected Members

The following have been elected to the grade of membership indicated, as the result of the latest ballot sent out by the society:

MEMBERS

Samuel A. Anderson, 412 Fourth street, San Francisco, Cal.

S. Morgan Bushnell, 135 Adams street, Chicago.

Frank T. Chapman, Engineers' Club, New York.

Arthur E. Duram, 1108 American Trust building, Chicago.

Elliott Lee Ellingwood, 1005 Union Trust building, Los Angeles, Cal.

M. L. Foote, Columbus, O.

A. Edson Hall, State Capitol, Albany, N. Y.

Ralph S. Hayward, 123 East Kinzie street, Chicago.

Edmund J. Hurley, 550 West Twenty-third street, New York.

Charles D. Kirk, 788 Beverly street, Winnipeg, Man.

Wm. F. McDonald, 1810 Ford building, Detroit, Mich.

Will A. Shorb, Decatur, Ill.

A. E. Weikhoff, Lafayette, Ind.

Edward L. Wilson, 1201 Q street, N. W., Washington, D. C.

ASSOCIATE MEMBERS

Charles Morrison, 35 Laurel street, Melrose, Mass.

Wm. A. Youngquist, 1200 Michigan avenue, Chicago.

JUNIOR MEMBERS

Laurance C. Jost, 4935 Rubicam avenue, Philadelphia.

Murray J. Marvin, Tuskegee Institute, Alabama.

Illinois Chapter Starts Publicity Campaign

A campaign for better ventilation methods in public buildings has been started by the Illinois Chapter of the American Society of Heating and Ventilating Engineers. W. L. Bronaugh, the Illinois member of the central publicity committee, has taken steps to secure the coöperation of the city and State medical societies in the organization's efforts to acquaint the general public with the dangers of impure air.

National Association of Brass Manufacturers

At the annual meeting of the National Association of Brass Manufacturers, held in New York December 8, the following officers were elected for the ensuing year:

President, Theodore Ahrens, Louisville, Ky.

Board of Trustees, A. S. Hills, Haydenville, Mass.; D. M. Roberts, Detroit, Mich.; C. C. Hale, New Haven, Conn.; W. H. Wasweyler, Milwaukee, Wis.; F. Somerville, Toronto, Ont.; J. W. Sharpe, Jr., Philadelphia; Theodore Ahrens, ex-officio.

Delegates to the National Convention: J. J. Ryan, Chicago; C. K. Sanborn, New York.

The next meeting will be held in Cleveland, O., March 6 and 7, 1910.

American Society of Mechanical Engineers

The spring meeting of the American Society of Mechanical Engineers will be held this year as usual, in addition to the London meeting which is scheduled for July. Atlantic City has been chosen for the spring meeting and the date has been fixed, being from May 31 to June 6, inclusive. The headquarters during the meeting will be at the Marlborough-Blenheim Hotel.

The total attendance at the recent thirtieth annual meeting, December 7-10, was 628 members and 435 guests. Officers were elected for the ensuing year as follows:

President, George Westinghouse; vice-presidents, Charles Whiting Baker, W. F. M. Goss, E. D. Meier; managers, J. Sellers Bancroft, James Hartness, H. G. Reist; treasurer, William H. Wiley. The council re-elected Calvin W. Rice secretary.

THE HEATING AND VENTILATING MAGAZINE

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OPPONENTS of the "down draft" system of ventilation are getting their innings in Chicago in consequence of the recent adoption by the local board of education of a new type of school building. The keynote of the agitation is sounded by Mrs. Ella Flagg Young, the newly appointed superintendent of Chicago's schools. "The system of ventilation used in the Chicago schools," she says, "the 'down draft' type, was exploded long ago by scientific inquiries. For years I have known that the children were not getting good air and I suggested a change. Now is the time and we will bring it about, if possible."

Dr. W. A. Evans, the Chicago commissioner of health, adds his indorsement of "up draft" ventilation, his views being contained in an article on another page of this issue.

It is a generally accepted engineering fact that both the up and down draft types of ventilation can be made to operate satisfactorily. That they do not always do so is equally well known, and it is this element, no doubt, that will turn the scales, if they are turned, in favor of the up draft system for schoolhouse and similar work.

We recall the characterization given downward ventilation by William J. Baldwin a few years ago in these columns to the effect that such a system maintains a "standard of impurity," when used in auditoriums and similar apartments. He instanced the case of a school room where fifty gentlemen were smoking, instead of fifty children. The room had bottom ventilation only. The smoke went directly to the ceiling and then began to pack down in a cloud, until it reached the floor or the top of the lower register, when it commenced to flow away. In this case, he said, the standard of impurity was a room full of smoke.

SINCE expressing the opinion last month that publicity pays in association work as well as in other fields of activity, the conviction has been borne in upon us by the sequel that has followed the issuance "to members only" by the National Association of Master Steam and Hot Water Fitters of a pamphlet on the subject of vacuum heating patents. Not only have the contents of the pamphlet become widely known outside of the association's circle of membership, but the interests most directly affected have assumed the strategic position by coming out publicly with a reply that practically quotes the important features of the association's pamphlet. Thus the burden of proof, so far as the public is concerned, is made to rest on the shoulders of the association when it easily might have been shifted the other way.

MECHANICAL EQUIPMENT

High Pressure Steam Piping

PART I.

Typical Systems and Schemes for Power Plant Work

BY PERRY WEST, M. E.

Some of the general features of this subject are applicable to all classes of power plant piping and will be treated accordingly. It is the writer's opinion that there is a greater need for discussions of the underlying principles of piping design than there is for examples of the various practices which are being employed. The examples are, of course, useful, and it is necessary to know what practices among these are proving successful. There appears to be a lack of information which would tend to an intelligent discrimination between the good and bad features of the examples already before us.

The life of piping is now considered one of the most important questions connected with the plant. The quality of material and workmanship control this to quite a considerable extent; but even the best materials put up by the best workmen cannot be made to stand the excessive strains and vibrations imposed by modern requirements unless they are properly cared for in the design. Special designs are becoming more popular every year. Often by the expenditure of a comparatively small amount on bends or special fittings very large savings in economy and space can be effected. Former practice seems to teach that the once much thought of duplicate system is not altogether satisfactory for preventing shut-downs. The general method now is to use one system and to leave in this as few opportunities for breakdowns as possible. To this end we may note that quite a bit of study has been given to designs of this kind in the past few years. Engineers have also come to learn the true value of the losses due to bad piping and are constantly striving to reduce these to a minimum. The realization of the fact that it is easier and better to make piping special than to discommode a whole plant is also bringing out many new and useful designs in this connection. It certainly behooves the engineer to make his piping as good as any other part of a plant, and in this age of such durability and economy in plants, the piping must be of the very best.

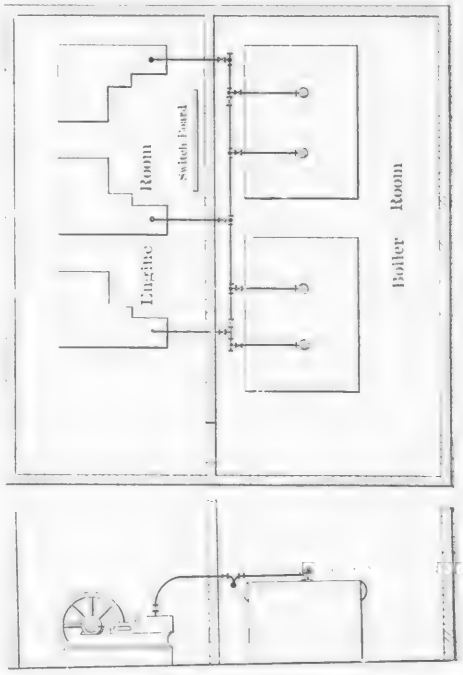


FIG. 1—"BACK TO BACK" SYSTEM OF PIPING FOR SMALL PLANTS

Notwithstanding the fact, therefore, that the piping is a very small part of a power plant, it has come to be one

of the leading questions with the power plant engineers. It is one which always has to be solved by him regardless of the disposition of many others which should be.

Systems and Schemes

Regarding systems and schemes, much might be said for which space cannot be taken here. A discussion of some of the fundamental features of the most popular practices only will be attempted.

Of the points to be considered, may be mentioned the following:

as shown in Fig. 2, has recently become very popular. In this latter system each prime mover has its complement of boilers separately piped and connected.

A properly valved tie over line forms a cross connection for the several units in case of a break-down. This system has several advantages over others for cases to which it is properly applicable. The principal conditions which decide for or against it are: size of installation, desirability of operating sections of the plant sep-

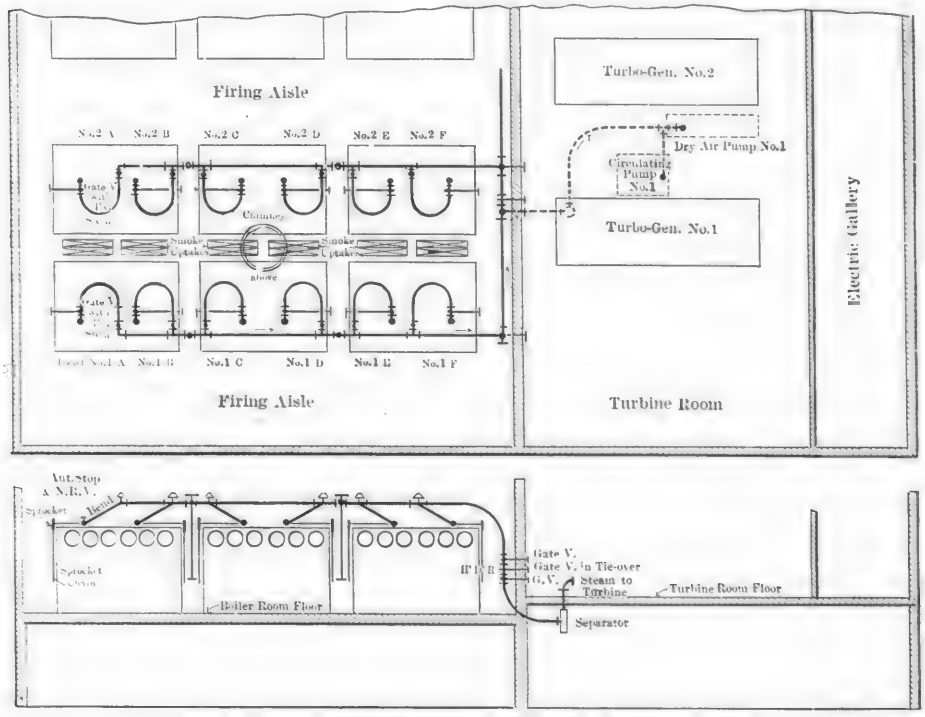


FIG. 2—UNIT SYSTEM OF PIPING FOR LARGE PLANTS

(1) Economy, convenience and reliability.

(2) Operative facilities.

(3) Flexibility.

(4) Special provisions for extensions and tests.

The dictates of economy are that runs shall be as short as possible. Convenience is also generally found in a compact arrangement if ample passage ways are provided. For small plants the "back to back" arrangement, as shown in Fig. 1, is a good one. For larger installations, the "unit system," arately, and the question as to whether boilers and engines work out to even lengths, if disposed in two single parallel lines.

The division of a plant into units tends to localize break-down troubles and allows an easy division of the operating force into crews, having each the particular care of one or more units. The latter feature helps to fix responsibility, and may also be the means of dispensing with certain crews on the low load shifts. The economical operation of most any

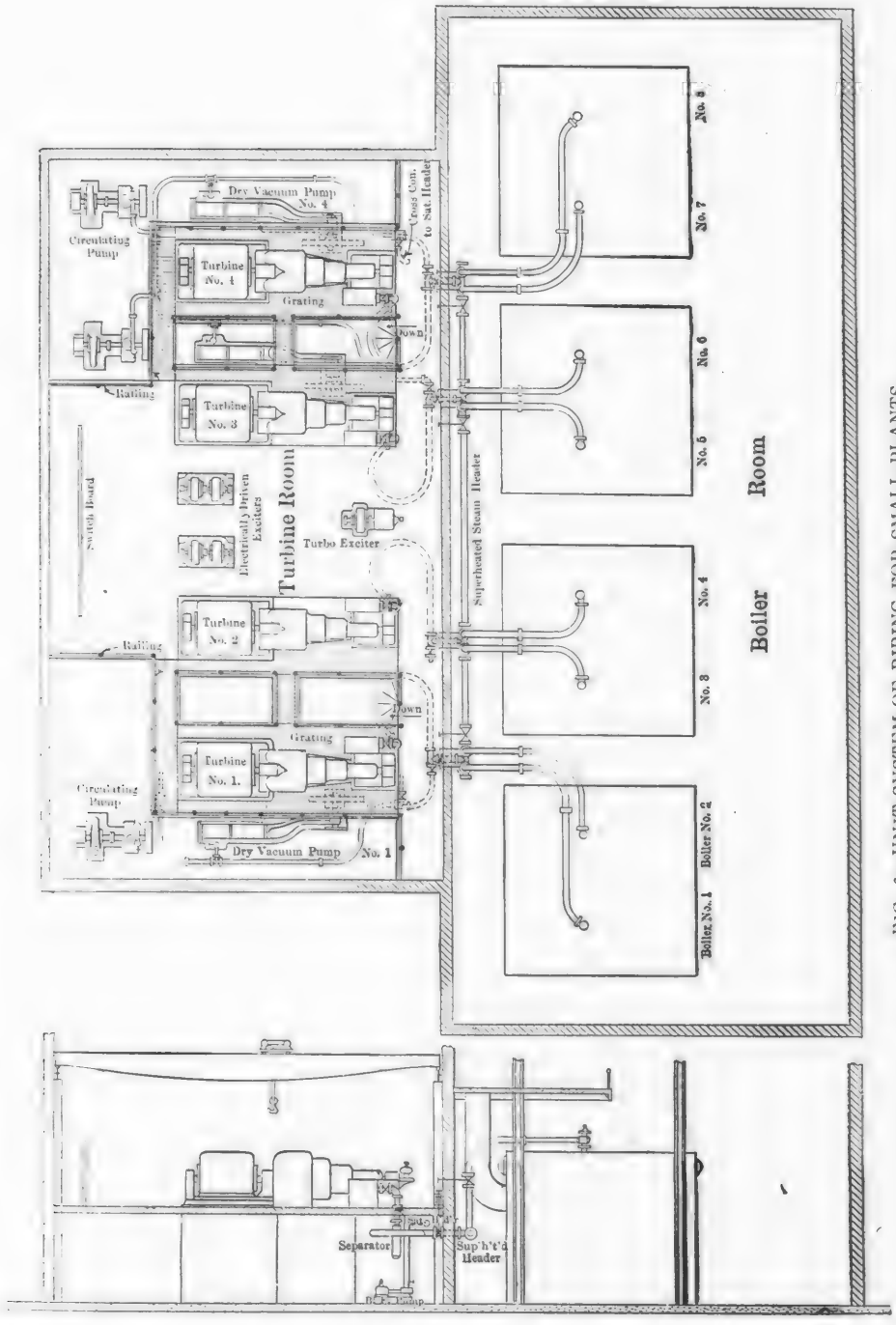


FIG. 3—UNIT SYSTEM OF PIPING FOR SMALL PLANTS

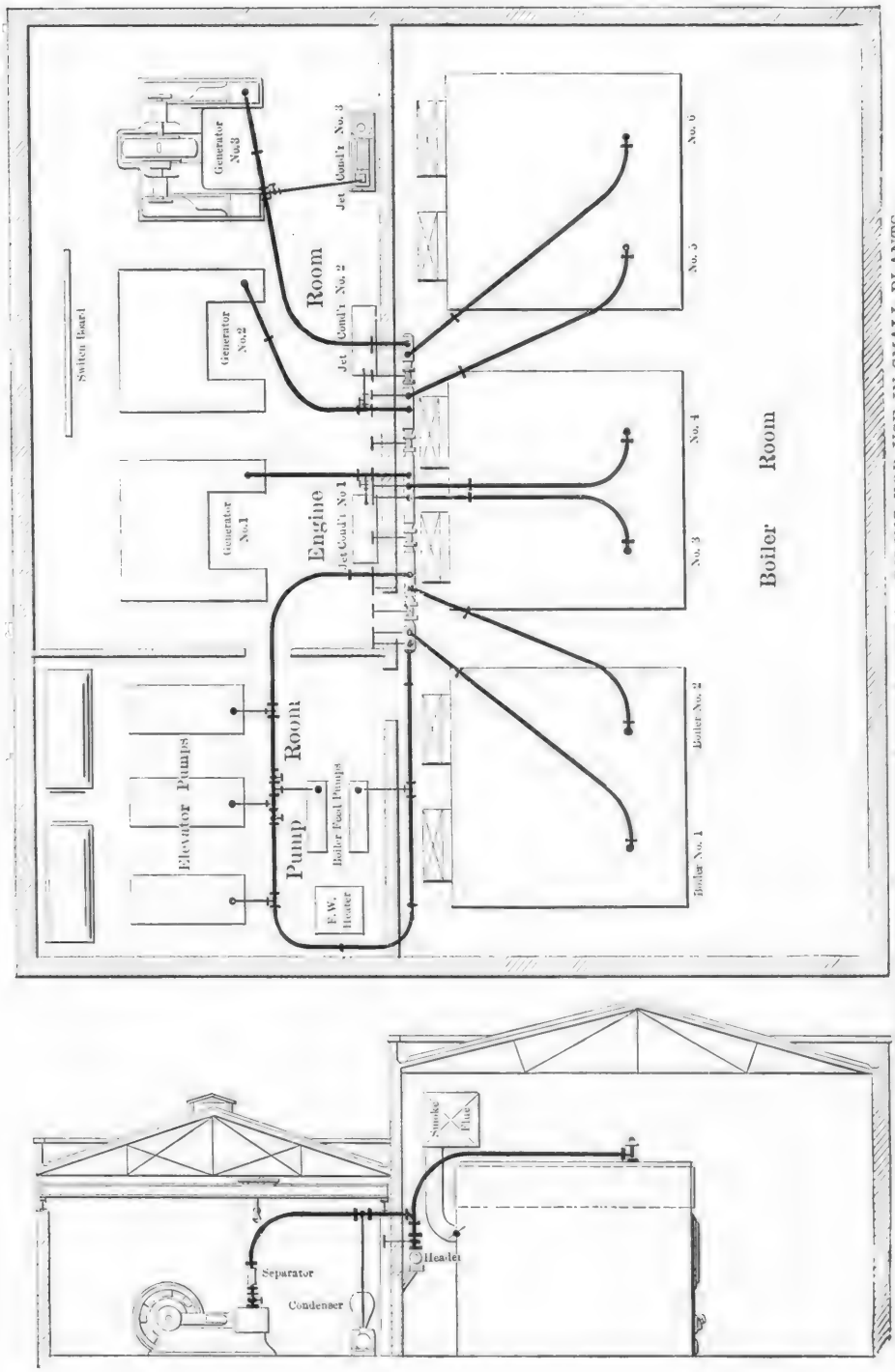


FIG. 4—"SPIDER" SYSTEM OF HIGH PRESSURE STEAM PIPING FOR USE IN SMALL PLANTS

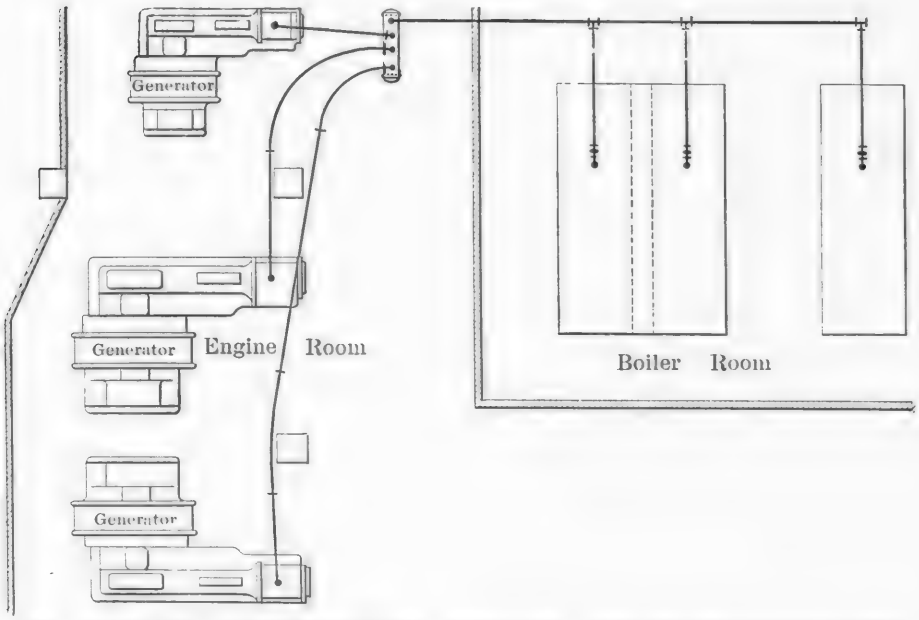


FIG. 5—"SPIDER" SYSTEM OF PIPING, EMPLOYING A HEADER WITHOUT VALVES

plant requires that different combinations of the units be operated on the different loads.

In the unit system it is possible to close down a corresponding proportion of the boilers every time a prime mover is taken out of service, thus cutting down unnecessary heat losses and allowing more time for repairs. If this unit system is extended to the auxiliaries, as shown, these may also be simultaneously closed off, with the consequent savings of radiation from their piping. This arrangement is convenient for testing, as each unit may be isolated and tested or compared with the other units as to steam and coal consumption. Future extensions are also easily made.

Most of what has just been said regarding the unit system, as applied to large plants with cross-fire aisles, is equally true of the smaller plant with two parallel lines of boilers and engines. The main difficulties in its application to the smaller plants are that it may necessitate a division of the boilers into units too small for practical results, and that extra valves, etc., may increase the cost of piping above that warranted by the size of the installation.

A number of small boilers may require a room out of proportion in length to that of the engine room, and, as already mentioned, this is another factor which usually works against the unit system for small plants. If in such cases a unit arrangement is used, the layout shown in Fig. 3 is recommended.

THE SPIDER SYSTEM

The "Spider" system, as shown in Fig. 4, is also good practice in many small plants. In this arrangement the boiler leads are brought to one central header from which the supplies are taken for the various units. This main header is made as short as possible, being just long enough to contain all valves and outlets. It should be of the very best construction. The valves for controlling the inlets and outlets are placed on the opposite side of a wall, wherever possible, and are arranged to be operated by extension stems, so that in case of a break-down steam may be closed off and change-overs made without closing down the plant. The shortness of such a header minimizes dangers from break-downs in same, and brings all the principal valves close together. Operation is simplified, due to the fact that it is not necessary to search out the valves to be operated. The lines leading to any

particular unit and its auxiliaries may be easily closed down at the time the unit is taken out of service. The shortness of the header also gives small surface for radiation. The principal disadvantage of this system is its rather awkward appearance.

Fig. 5 shows a "Spider" system employing a header without valves. The disadvantages of this, as compared to the one shown in Fig. 4, are that a break-down inside of any of the branch valves necessitates closing down the entire station, and may cause serious accident, due to the release of steam from the entire boiling plant. Normally, the header (Fig. 4) may be operated with all its valves closed, in which case the blowing of a gasket or other accident in one section will not allow the escape of steam from all the boilers; thus minimizing the dangers from such accidents and preventing the closing down of more than one unit. It may be said of the header without valves that it is much cheaper, and that it may be made shorter, thus reducing radiating surface and the quantity of material subject to pressure. The elimination of the joints at valves is also in its favor. It should be remembered, however, that if, with the addition of joints, a valve is added which will protect a number of units, not only from accidents to the added joints, but from many others, the balance is in favor of the extra joints and valve, as far as reliability is concerned. As to additional cost for valves, these may be made smaller than the header, owing to their emergency character and the shortness of run. The sections of a valved header should be made of cast steel or by welding nozzles to steel pipe, so as to decrease the danger of rupture to all sections in case of accidents to one. The valveless header may be made of boiler plate or by welding nozzles on to steel pipe, and may in this particular possess some advantages over the valved one as to ease of construction.

Fig. 6 shows a ring header, which is perhaps the best form of a duplicate system. Its chief disadvantages are: excessive first cost, together with the liability of getting neither branch quite as good as one main might otherwise be made, the liability of one branch being closed down for repairs and remaining so until the other side also breaks down, and the inconvenience of future extensions. In case of a single header, repairs are made promptly on account of their more urgent need. In some instances the ring header may be used without much additional cost, and if other conditions and requirement are especially favorable, may be advantageous.

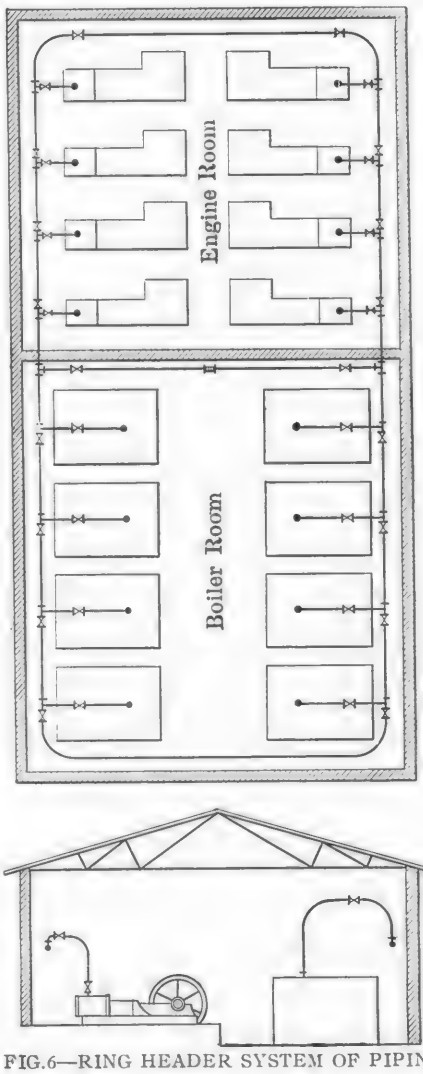


FIG.6—RING HEADER SYSTEM OF PIPING

In most plants, especially if condensing, it is desirable to have some of the apparatus located below the engine room floor. The boiler room floor, on the other hand, may be designed as

low as possible, so as to increase facilities for handling coal. These conditions often result in a difference of from 6 to 12 ft. in floor elevations, the engine room floor being the higher. In such cases the header is run either very low or very high, relative to boiler outlets. The use of a traveling crane over the engines sometimes prohibits the running of the engine connections near the ceiling, in which case they may, with better results, be carried over under the engine room floor. In this case it is advisable to have the header low, so that the connections may be taken from the top and fall towards the engines. The placing of engine connections below the floor helps the looks of a plant, and they may be brought up to the throttles with semi-circular pipe bends, or be run direct with valves below and floor stands above.

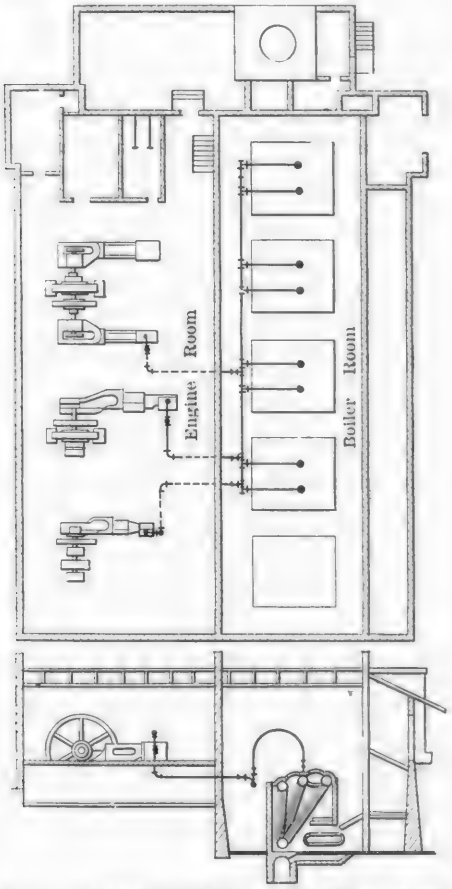


FIG. 7—ARRANGEMENT OF PLANT WITH BOILERS AND ENGINES ON DIFFERENT LEVELS

Fig. 7 shows an arrangement of this description which, as can be seen, works out very satisfactorily.

Special Fittings

Regarding special fittings, it may be said that their use is generally advisable wherever joints may be avoided by doing so. In dealing with superheated steam at high pressure, the elimination of joints means a great deal towards diminishing the possibilities of break-downs and lessens operative and maintenance charges. Gasket troubles, which multiply fast with increase of pressure and are especially hard to meet with superheated steam, are reduced. Wherever several outlets may be brought close together, a multiple outlet tee is usually advisable, in the long run, regardless of its possible additional first cost. Tees and fittings of special dimensions are usually preferable to standard ones with short "fillers" between. Long radius ells are no doubt advisable for high-class work as compared with standard radius fittings. Pipe bends have supplanted the special radius fittings, however, owing to their greater durability and flexibility.

Of the joints, it may be said that nothing new has been put forward in the past few years. All of the well-known types, such as the "peened flange," "Van Stone," "shrunk flange," "welded flange" and ordinary "screw flange," are still serving their particular purposes. It is not the purpose of this paper to elaborate on the details of each of these joints or to compare their adaptabilities to the different services. It may be said generally, however, that joints of the "Van Stone" and "welded flange" types have undergone considerable recent improvement. In Van Stoning, the end of the pipe is upset before being rolled over, so as to give extra thickness to the metal in the bend and for facing off. The ring flange is faced on all sides, thus giving an even bearing between the flange and the pipe. Improvements in methods have also brought the price of such improved joints down within reasonable reach of the screw or shrunk flange joint.

Methods of manufacturing the welded flange joint have also been improved to a point where its cost is not so prohibitive.

The materials employed for high-pressure work have changed somewhat in the past few years. Cast-iron fittings and valve bodies are still used with saturated steam below 200 lbs. pressure. Above this pressure and for superheated steam, cast steel is recommended. Recent tests and experience show that cast iron or semi-steel deteriorate in tensile strength very rapidly under temperatures corresponding to 200 lbs. or more.

For special fittings, branch tees, "Spider" headers, etc., nozzles and flanges welded to steel pipe are perhaps more durable and reliable than cast steel. In Fig. 4 is shown a header of this character.

Fig. 8 shows several special fittings and the uses to which they may be put.

PIPE BENDS

In providing for flexibility against expansion, vibration and other movements, pipe bend connections to fixed points and between large mains are recommended.

Expansion joints of various types are used to some extent, but their liability to leak, stick and give trouble otherwise has operated in favor of substituting pipe bends wherever possible. The force of lineal expansion in pipe lines is generally conceded to be practically irresistible, and the whole movement between any anchorage and a connection should be allowed for in designing the connection. It is not necessary that all of the movement shall take place on one side of the neutral or no strain position. In other words, a cold strain may be put in the connection by having the main shorter (by about one-half the estimated expansion) than the layout calls for. By this means the connection is strained in one direction when the system is cold and in the opposite direction when hot. The cold strain is gradually lessened as the temperature rises, and after passing through zero is gradually increased in the opposite direction to a maximum at the highest temperature. For connections to long lines, where considerable expansive movements acting in one direction only would produce excessive stresses, this method is quite useful. In using cold strain, it is important that the anchorages be properly located and of heavy construction. Also that the allowance in length of the piping, as erected, be exactly right for producing the correct cold strain, otherwise the advantages to be gained are lost.

The anchoring of any system, whether cold strain be used or not, is very important.

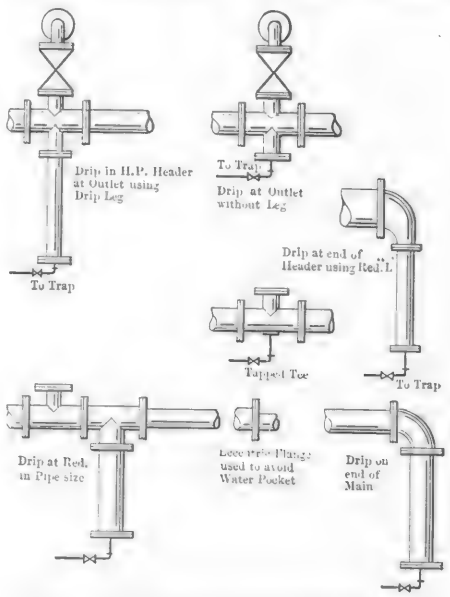

Drip in H.P. Header at Outlet using Drip Leg
To Trap
To Trap
Drip at Outlet without Leg
Drip at end of Header using Red. L.
To Trap
Tapped Tee
Drip at Red. in Pipe size
Drip on end of Main

FIG. 8—SPECIAL FITTINGS FOR VARIOUS USES

All the neutral points should be securely anchored to substantial, fixed points, so as to divide expansive movements correctly between the several connections. Relying on the connections as anchors allows the larger ones to transfer most of the movement to the smaller or weaker ones.

(To Be Continued)

Current Heating and Ventilating Literature

Under this heading is published each month an index of the important articles on the subject of heating and ventilation that have appeared in the columns of our contemporaries. Copies of any of the journals containing the articles mentioned may be obtained from THE HEATING AND VENTILATING MAGAZINE *on receipt of the stated price.*

CENTRAL STATIONS

Central Stations for Towns of 1,000 or 1,200 Inhabitants. Caryl D. Haskins. Gen El Rev—Nov., 1909. 7,000 w. 40c.

Gives preliminary facts and figures on the costs of such installations.

The Berlin System of Central Stations. Frank Koester. Engg Mag—Nov., 1909. 10 figs. 3,800 w. 40c.

Gives details of the various light and power stations for supplying the city.

FAN, VENTILATING

A New Ventilating Fan for Mines. M. C. Mitchell. Mines & Min—Nov., 1909. 3 figs. 1,300 w. 40c.

Describes a novel device for changing the fan from exhausting to blowing without the use of doors.

HOT-WATER HEATING

Heating and Ventilation of the Museum of Fine Arts, Boston. Plans and description of the fan, coil, radiator, and duct installations of a plant which will ultimately serve a group of buildings. 3,000 w. Eng Rec—Nov. 13, 1909. 30c.

HUMIDITY

Moisture Contained in the Atmosphere. N. A. Carle. Power—Nov. 2, 1909. 1 fig. 700 w. 20c.

Gives chart for determination and examples of its use.

The Measurement of Humidity. Samuel K. Patteson. Cassier's Mag—Nov., 1909. 2,800 w. 40c.

Discusses practical engineering considerations relating to atmospheric moisture.

MECHANICAL PLANTS

Mechanical Equipment of the Washington Municipal Building. Describes the mechanical plant for a 5-story structure occupying an entire square. Ills. 4,000 w. Eng Rec—Oct. 30, 1909. 30c.

OZONE

The Present Status of Ozone. G. M. Dyott. Reasons for its slow development, and discussion of uses. 1,500 w. Elec Wld—Nov. 4, 1909. 20c.

PIPE FITTINGS

Pipe Fittings—Theory vs. Practice in Their Manufacture. F. W. Barrows. Considers the necessary attributes of a good fitting. 1,200 w. Mach, N Y—Nov., 1909. 40c.

PIPE THREADING

Modern Machines for Pipe Threading. J. F. Springer. Illustrated descriptions of large pipe threading machines of recent design and examples of hand threading in inaccessible places. 3,500 w. Am Mach—Vol. 32. No. 45. 20c.

SCHOOL BUILDINGS

The Heating and Ventilating of Schoolhouses in Exposed Localities. Charles F. Eveleth. Considers fundamental points that must be kept in mind when planning the building. Describes briefly a number of systems. 5,000 w. Am Archt—Nov. 17, 1909. (Special No.) $1.00.

The Heating and Ventilation of Schools in Congested City Districts. Frank G. McCann. An illustrated discussion of the special problems in such buildings. 2,000 w. Am Archt—Nov. 17, 1909. (Special No.) $1.00.

SHOP HEATING

Notes on Shop Heating Plants. Warren H. Miller. On the design of such plants, and outlining a forced circulation hot water system. 3,000 w. Am Mach—Vol. 32. No. 47. 20c.

STEAM HEATING

Vacuum Steam Heating. R. W. Otto. Briefly describes the one-pipe and the two-pipe systems of vacuum heating, discussing their economy, convenience, etc. 2,500 w. Minn Engr—Nov., 1909. 40c.

STEAM PIPING

The Loss of Heat from Uncovered Steam Pipes. William Ledyard Cathcart. An illustrated study of the radiation of heat from bare piping. 5,000 w. Cassier's Mag—Nov., 1909. 40c.

The Design of Steam Pipe Lines. T. K. Roberts. Gives directions for calculating the diameter of steam pipe, with example illustrating the use in design of tables given. 2,500 w. Ind Engng—Nov. 15, 1909. 20c.

Some Points About Drips. George W. Martin. Illustrated discussion of the best manner of arranging the piping of steam-power plants to take care of drips. 900 w. Power—Nov. 2, 1909. 20c.

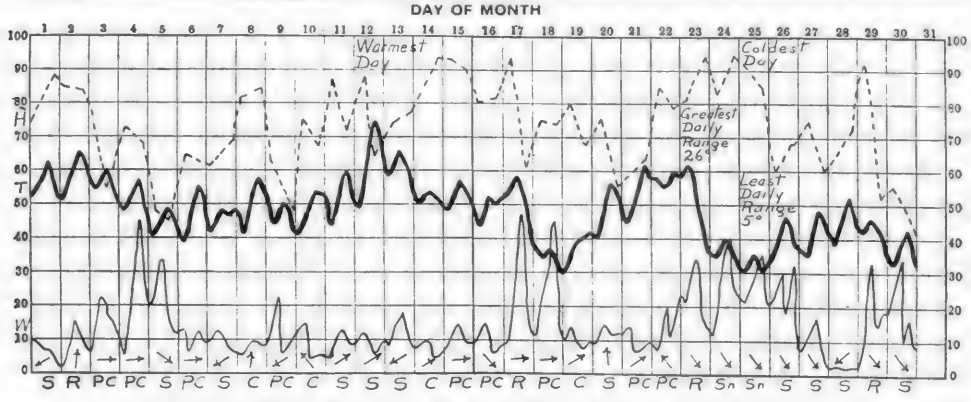
Standardization of Catalogues

Consul Augustus E. Ingram, of Bradford, suggests that the following British idea would be worthy consideration by American concerns issuing catalogues:

An Engineers' Standardized Publications' Association has recently been formed, having its headquarters at Craven House, Kingsway, London, W. C. Its object is to persuade manufacturers to conform to mutually agreed standards in the size and arrangement of price lists and catalogues, and facilitate reference to these publications by scientific classification of their contents.

The Weather for November, 1909

	New York	Boston	Pittsburg	Chicago	St. Louis
Highest temperature, degrees F. . .	74	76	73	71	78
Date of highest temperature	12	12	14	11	7
Lowest temperature, degrees F. . . .	30	27	23	28	24
Date of lowest temperature.	25	30	24	23	18
Greatest daily range, degrees F. . . .	26	31	31	28	34
Date of greatest daily range.	23	23	28	16	22
Least daily range, degrees F.	5	5	5	6	7
Date of least daily range.	25	13	18	17	29
Mean temp. for month, degrees F. .	48	46	50	48	54
Normal temp. for this month	43.9	42	43	39.3	45
Total rainfall, inches.	1.58	4.11	0.84	3.84	4.36
Total snowfall, inches.	1.10	Trace	0.2	Trace	0
Normal precipitation, this month. .	3.39	4.04	2.34	3.84	2.88
Total wind movement, miles.	9232	7510	7425	12476	8682
Aver. hourly wind velocity, miles .	12.8	10.4	10.3	17	12.2
Prevailing direction of wind.	N. W.	S. W.	S.	S.	S.
Number of clear days.	11	6	10	4	10
Number of partly cloudy days.	11	8	8	11	8
Number of cloudy days.	8	16	12	15	12
Number of days on which rain fell.	4	8	6	12	9
Number of days on which snow fell	2	1	3	1	0


DAY OF MONTH
Warmest Day
Coldest Day
Greatest Daily Range 26°
Least Daily Range 5°
H
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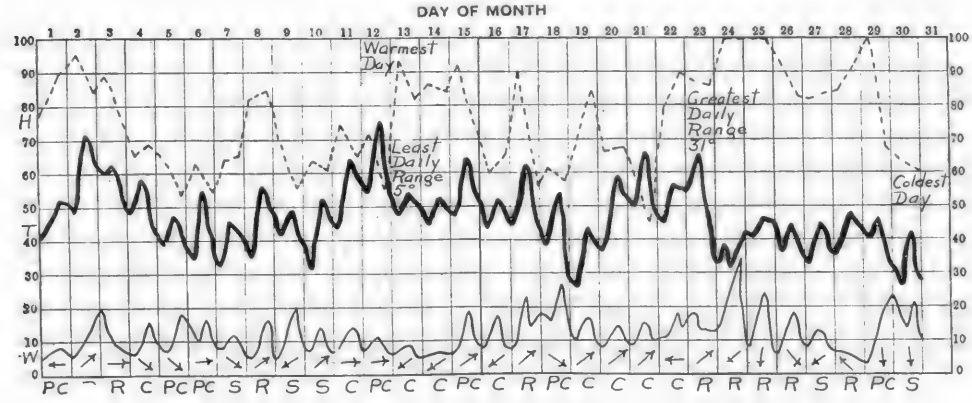
S R Pc Pc S Pc S C Pc C S S S C Pc Pc R Pc C S Pc Pc R Sn Sn S S S R S

RECORD OF THE WEATHER IN NEW YORK FOR NOVEMBER, 1909


DAY OF MONTH
Warmest Day
Least Daily Range 5°
Greatest Daily Range 31°
Coldest Day
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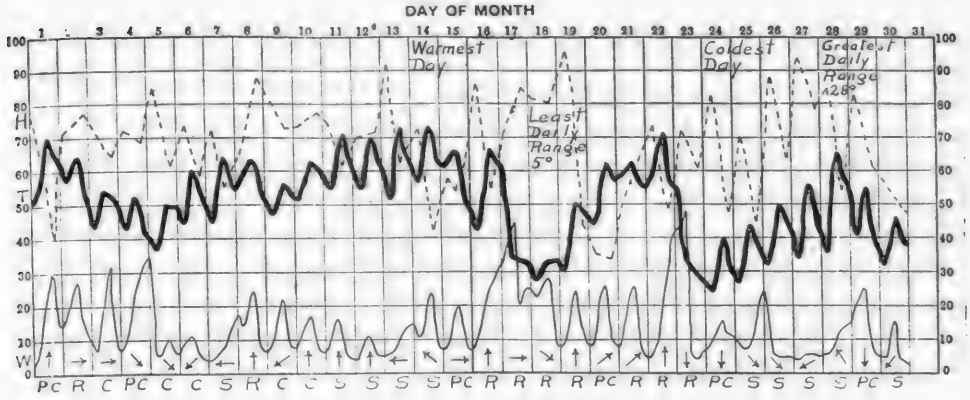
Pc R C Pc Pc S R S S C Pc C C Pc C R Pc C C C C R R R R S R Pc S

RECORD OF THE WEATHER IN BOSTON FOR NOVEMBER, 1909

Plotted from records especially compiled for THE HEATING AND VENTILATING MAGAZINE by the United States Weather Bureau.
Heavy lines indicate temperature in degrees F.
Light lines indicate wind in miles per hour.
Broken lines indicate relative humidity in percentage.
S—clear, C—partly cloudy, C—cloudy, R—rain, Sn—snow.
Arrows fly with prevailing direction of wind.


DAY OF MONTH
Warmest Day
Coldest Day
Greatest Daily Range 28°
Least Daily Range 5°
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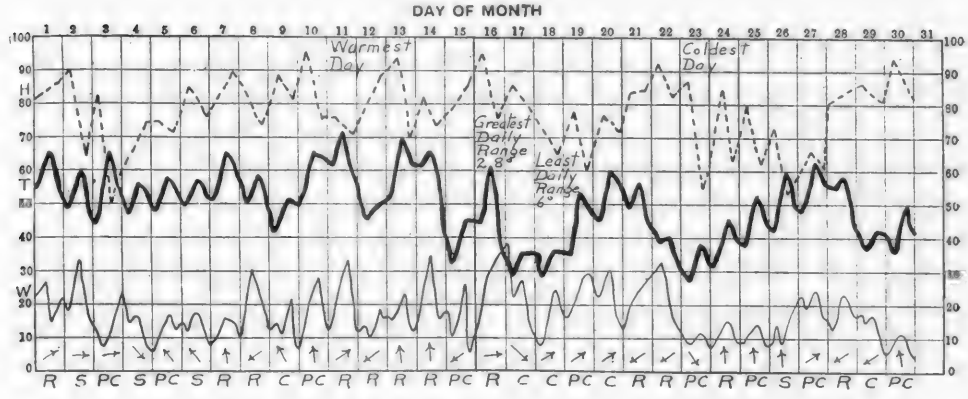
RECORD OF THE WEATHER IN PITTSBURG FOR NOVEMBER, 1909


DAY OF MONTH
Warmest Day
Coldest Day
Greatest Daily Range 28°
Least Daily Range 6°
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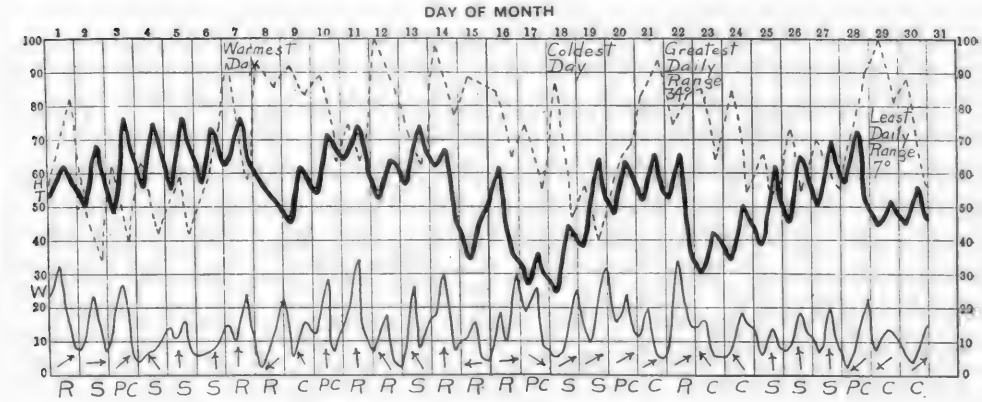
R S Pc S Pc S R R C Pc R R R R Pc R C C Pc C R R Pc R Pc S Pc R C Pc

RECORD OF THE WEATHER IN CHICAGO FOR NOVEMBER, 1909


DAY OF MONTH
Warmest Day
Coldest Day
Greatest Daily Range 34°
Least Daily Range 7°
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R S Pc S S S R R C Pc R R S R R R Pc S S Pc C R C C S S S Pc C C

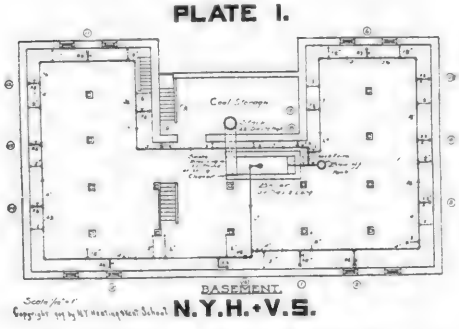
RECORD OF THE WEATHER IN ST. LOUIS FOR NOVEMBER, 1909

Plotted from records especially compiled for THE HEATING AND VENTILATING MAGAZINE by the United States Weather Bureau.
Heavy lines indicate temperature in degrees F.
Light lines indicate wind in miles per hour.
Broken lines indicate relative humidity in percentage.
S—clear, P C— partly cloudy, C—cloudy, R—rain, Sn—snow.
Arrows fly with prevailing direction of wind.

A New Method of Teaching Heating and Ventilation

A notable course of instruction in heating and ventilating engineering, which is attracting much attention in the trade on account of its wide scope and the unusually large amount of engineering information it contains, has lately been prepared by the New York Heating and Ventilation School, 1123 Broadway, New York. It is a correspondence course and has many features that stamp it as something "different."

Those who are familiar with the usual correspondence courses are aware of the amount of instruction that is given on such general subjects as various types of boilers, radiators, etc. In the course as laid out by the New York Heating and Ventilation School, it is apparent that information on these points on the part of the student is taken for granted. With this general matter eliminated, the designers of the course are able to put into effect in the first lesson their fundamental principle that the best method of learning heating and ventilation is by actually laying out plants.

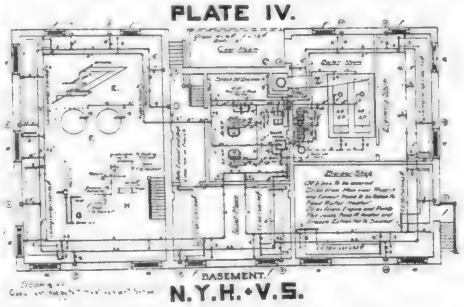


ONE OF THE LESSON SHEETS OF LESSON 1

The scheme, briefly, is to mail the student a set of plans showing a completely laid out heating and ventilating system. With these plans is furnished a key or code sheet. The code sheet contains the rules and other information by which the size, capacity, etc., of all apparatus are obtained. Accompanying the set of plans are blank plans of a building similar in construction to that shown in the completed set, but varying sufficiently to require a new layout.

After the student has become familiar with the completed plans and thoroughly understands the method of design and rules of calculation, he proceeds to figure and lay out the blank plans which form the example. His work is then returned for correction and comment, care being taken not only to point out any errors made but to make suggestions, when necessary, for improvements in the design itself.

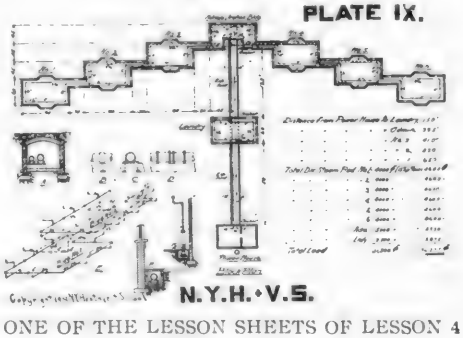
The unusual scope of the course may be seen from the character of the first few lessons. Lesson 1, for instance, deals with the design of a low pressure steam, one pipe, up feed, gravity return system.



ONE OF THE LESSON SHEETS OF LESSON 2

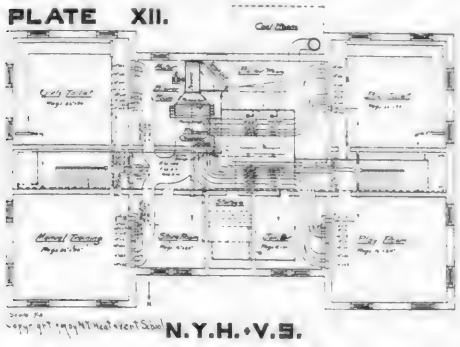
Lesson 2 takes up an exhaust steam, one pipe, down feed system. Lesson 3 is a factory job, low pressure steam, two pipe, down feed, gravity return, operated from an isolated plant. Lesson 4 is a design for steam heating group of buildings, with gravity return, from an isolated plant. Lesson 5 goes into ventilation, and is a design for a plant using direct steam radiation for walls and glass exposure, combined with a mechanical ventilation system. Lesson 6 goes deeper into the same subject, being a school house job, with steam hot blast, one and two pipe.

After thoroughly treating fan blast installations, the student is given instruction in the design of vacuum exhaust steam heating and forced hot water heating, while separate lessons are devoted to explanations of the many formulas given and to power plant work. In addition to the instruction sheets and charts, which become the property of the student, the course also includes numerous charts for the rapid calculation of pipe sizes for carrying from 100 to 50,000 sq. ft. of radiation, for figuring capacities of smokestacks for different heights, capacities and horse powers, together with others treating of humidity and forced hot water heating.



ONE OF THE LESSON SHEETS OF LESSON 4

Many flattering testimonials received from those who have seen the lessons would indicate that the course fills a long-felt want and is proving a boon to a large number of men in the heating trade who have not heretofore had the opportunity of perfecting their knowledge of



ONE OF THE LESSON SHEETS OF LESSON 6

the modern development of heating and ventilating engineering.

The course has been designed under the direct supervision of Mr. James M. Harrison, chief engineer and vice-president of the Harrison Engineering Co., New York, whose new Harrison air tube heater, the invention of Mr. Burt S. Harrison, has lately attracted widespread attention in the heating and ventilating world. Mr. Harrison's wide experience in the design and installation of vacuum steam, fan blast and forced hot water heating systems has given him a fund of knowledge regarding these three important branches of heating work which gives to the instruction contained in the course a stamp of authority that should prove most valuable to those who come under his tuition. The reasonable terms of the course, amounting to a first payment of $10.00 and six additional monthly payments of $5.00, should bring the lessons within reach of all who are interested.

A Demonstration Plant Generating Fuel Gas, Electric Current and Heat

A demonstration plant, comprising an installation for the composite generation and distribution of fuel gas, electric current and heat for heating has lately been completed by Dr. J. M. W. Kitchen in one of the buildings on his grounds at East Orange, N. J., and is open for inspection. The plant occupies the greater part of a commodious building originally designed for a stable, and the equipment includes a 75 H. P. gas producer as the basis for heat generation.

This producer has a number of novel features providing for the use of any kind of fuel. Tar in the gas is condensed in a simple manner, and is used regeneratively in gas making. The gas is especially well scrubbed, the scrubbing water being used in cycle, and an ammonia product secured from it. The gas is delivered to the gas engine and for other purposes of burning by an ordinary exhauster and blower. The engine jacket water is used in cycle at predetermined temperatures, and the heat of cooling is transferred to air for combustion. The exhaust gases of the engine are used to heat water, the gases being passed under pressure through a specially designed water heater, and the heated water of the system is used as feed water in a special steam-generating apparatus, the salient features of which are a furnace securing a practically perfect combustion, and the location of the chimney between the furnace and the boiler. The exhaust steam is used for heating in winter, and in summer is run through a condenser, securing indirect vacuum pressure for the engine or for a turbine.

Practically all the radiated heat from the elements of the plant and from the exhausted gases is transferred to air for combustion, which is used in the burning of fuel in the steam generator. The plant is designed to illustrate the great advantages of utilizing both steam and gas power compositely, and to show how the cost of generating fuel gas and illuminating gas may be so much reduced as to open up visions for the future of the almost entire replacement of solid fuel by cheap fuel gas, or by the distribution of the very much cheapened electric current.

Dr. Kitchen has been erecting the plant for the greater part of the past year, and has obtained much valuable information as the result of his numerous experiments regarding the manufacture and behavior of producer and other low-cost gas. The plant is well worthy of a visit from all interested in heating, as well as in power and central station work.

In addition to the plant described, Dr. Kitchen has also made provision in a specially constructed greenhouse for the testing of house-heating boilers. The particular greenhouse in question is now heated by a boiler of a well-known make. By changing the connections from this boiler to another, for which room is provided in the same quarters, it will be possible to observe the actual working conditions of any heater that may be installed. Dr. Kitchen, we understand, will be glad to make appointments with those interested to have them visit the plant at 94 Prospect street, East Orange, N. J., and see the plant in operation.

Mechanical Equipment Co., 206 Centre street, has been organized to carry on a contracting business in steam and hot water heating, power piping and ventilation. President, George E. Hall; secretary and treasurer, John J. Donovan; manager, B. P. Hall.

NEW DEVICES

The National '09 Heater

A new design of coil heater, which has been carefully and successfully tested out during the heating season of 1908-1909, presents a number of distinctive features of construction. It is known as the National '09 heater and is made by the National Blower Works, Milwaukee, Wis. The heater is made up of a group of sections, each section containing four rows of pipe. These sections are arranged one behind the other and held together by means of through bolts.

The steam enters the first section at the cold air inlet and passes in turn through each section as shown in Figs. 1 and 2. There is a header at each end of the section, and the base is so arranged that there is perfect drainage of the water of condensation from both ends of each section, which flows to a common pipe header underneath by means of separate drips.

There is but one steam inlet and one valve for the control of each group of coils, and it has been found by throttling this valve that the temperature of the air can be regulated to any desired degree. In fact, with the steam circulating in series through each section, as good control can be obtained with this one valve as with independent steam connections,

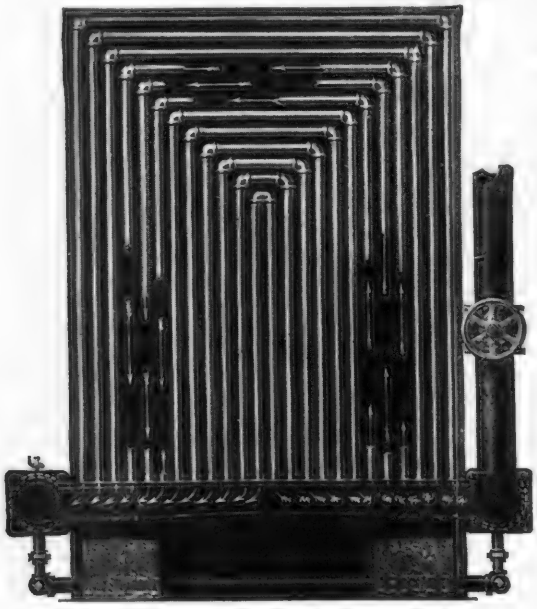


FIG. 1—SECTIONAL ELEVATION OF NATIONAL '09 HEATER, SHOWING COURSE OF STEAM IN PASSING THROUGH PIPES

which makes the piping much simpler and eliminates the use of numerous valves, there being no valves whatever on the drips.

With the steam circulating in series, all the air is driven to the last row of pipes, and is there allowed to escape through air valves into the atmosphere, or it may be piped to any convenient point. The terminal section is so constructed that the air is perfectly separated from the steam before reaching the air valves. A ¾-in. globe valve on

FIG. 2—GROUP OF SECTIONS, SIDE VIEW ENCASED IN SHEET STEEL JACKET.

the header of the terminal section allows the air to escape rapidly when steam is first turned on the heaters, and the valve may be left open at all times when less than the total amount of sections are in use.

It will thus be seen that, though steam at 1 or more pounds pressure may be carried on the supply pipe, it is allowed to expand to atmospheric pressure in the heater and a perfect circulation obtained.

In extreme weather, when all sections are in use, it has been found that it is never necessary to carry more than from ½ to 1 lb. pressure on heater to obtain perfect results, and in ordinary weather practically no pressure is required.

When the drips are connected to traps or to a receiving tank it is advisable to run a ¾-in. equalizing pipe from the terminal section to such trap or receiver to balance the pressure and insure perfect drainage from drip headers.

A pet cock is placed on the end of each section to enable the operator to tell when each section is filled with steam. By manipulating the main supply valve any number of sections may thus be used.

Danger from freezing is entirely eliminated, for as long as the steam supply is sufficient to feed one section there can be no possible freezing, as all steam is concentrated in the one section instead of being distributed over the whole heater and only partially filling the pipes of each section.

A uniform temperature of air is obtained whether one or more sections are in use, there being no cold currents due to imperfect circulation of the steam through the heater.

This heater is adapted for both live and exhaust steam, and where part of sections is to be used on exhaust and balance on live steam, two terminal sections are used, being placed in the central portion of the heater.

Copper gaskets are used on all installations and heavy spring washers take up the expansion and contraction of through bolts, so that there can be no possible leakage.

Fig. 1 shows the course traveled by the steam in passing through heater, while Fig. 2 is a side view of a group of sections encased in a sheet steel jacket as ordinarily used in a draw-through apparatus in connection with a fan.

Most gratifying results have been obtained on installations covering the winter season of 1908-09, which include the heating of schools, factories and drying plants.

The National patent '09 heater is suitable for every class of work where a blast coil is used.

Plans showing arrangement for any particular class of work, we understand, will gladly be furnished by the National Blower Works, Milwaukee, Wis.

"Squirrel Cage" Fans

The latest form of the "high-speed" or "many-blade" type of fan is now being placed upon the market by the Massachusetts Fan Co., of Watertown, Mass. As in other makes of multi-blade fan, the wheel consists of a large number of shallow curved blades, each of which is secured at one extremity to a disc, and at the other to an annular ring. The many shallow blades furnish the requisite blade area for the air delivered and permit a large inlet area, which is a valuable feature, for it materially reduces one of the greatest losses of power in the operation of the fan. With a small inlet the air must enter at high velocity, and this velocity is entirely destroyed before the air is delivered.

Well described by the term "squirrel cage," this fan wheel is the result of an extended seeking for higher efficiency and more capacity in a small space. It has a greater air delivery than other multi-blade fans and far exceeds the capacity of older type because it overcomes the most serious defect of the so-called "paddle wheel" fan. With few blades, eddies and pulsations are formed because the outer ends of the blades are farther apart than the inner ends, yet the density of the air at the outer ends is greater. In the early types of "many-blade" fans the removal of all blades in the inlet was an attempt to reduce the eddying effect by restricting to the shortest period possible the time the air is subjected to blade action. As a result a high velocity was imparted suddenly to the outer shell of air in the inlet, the velocity being gradually reduced toward the center.

In the "squirrel cage" fan this defect is overcome by using a few long blades extending toward the center of the wheel, but not radial. The scooping action of the blades starts the air in motion gradually, giving it a slowly whirling motion and then a rapid radial motion toward the small peripheral blades. A study of the action of the air shows that the direction of the long blades should be the same as the component of the two forces, the centrifugal motion and the whirling motion. Because the centrifugal force varies with a change in velocity, the position of the long blade must be changed for each peripheral speed, if maximum efficiency is to be secured.

SQUIRREL CAGE FAN

To provide for the many different conditions under which fans are used and to make possible the most economical speed of motor, engine or turbine, the Massachusetts Fan Co. has made three standard designs, known as types A, B and C, each of which is made in single and double widths.

Type A is for the low peripheral speeds which have been found to be best adapted for public building work, and for certain conditions for high pressures when the fans may be driven by a direct connected steam engine.

Type B is for higher peripheral speeds, such as those of high-speed motors, especially of the alternating current type, while type C is for very high speed, such as that of steam turbines.

Test of Air Washer for Extracting Bacteria from Air

An interesting test of an air-washing device, to determine its efficiency in extracting bacteria from air, was made recently by the biological department of one of the large manufacturers of pharmaceutical supplies.

The apparatus tested was a McCreery air washer, equipped with a humidity-regulating device. The tests were made in Toledo, the apparatus being installed in the open shop, and air taken from the upper portion. Very little work was being done in the shop at the time, and the air was relatively free from dust. The following tests were made:

1. The ordinary air of the shop was passed through the machine while the water was not running. Two plates (Nos. 1 and 2) were exposed to the exit air for 2 min. each. The plates developed three colonies each. It should be stated, in accounting for this small number of germs, that in addition to the air of the shop being relatively free from dust, the inside of the machine was wet, which condition of affairs acted as a germ-arrester.

To demonstrate this fact, a third plate (No. 3) was exposed for 2¼ min. to the air at the point of entrance to the machine. Additional time was allowed this plate because the speed of the air at this point was only about two-thirds of the speed at the point of exit. This plate developed 20 colonies.

2. Water was then turned onto the machine, and two plates (Nos. 4 and 5) exposed at the exit for 2 min. each. These plates developed five colonies each. In accounting for these few colonies, it might be stated that the exit pipe was 5 in. in diameter, and that in introducing the plate (4 in. in diameter) the unopened petri dish was introduced into the mouth of the tube in a horizontal position, the cover removed, then pushed further into the tube and inclined at an angle of about 45°, the lower portion of the plate usually touching the bottom of the tube. On removing the plate when the time-limit was up, it was drawn toward the mouth of the tube, the cover replaced, and the entire petri dish withdrawn and set aside. During the 2 min. exposure the cover was held in its normal position in the left-hand outside of the tube. Care was taken to so prepare the plates that there was no water of condensation on the under side of the cover. However, with all the precautions, it is possible that the contamination of the plate occurred at the mouth of the exit tube from the outside air drawn into the swiftly moving current of exit air.

3. Owing to the paucity of the germs in the air of the shop, it was deemed advisable to introduce germ-laden dust into the entrance air. Fine dust from the road and from various portions of the earth floor of the shop was taken, sifted, and the finer portions were slowly and continuously introduced into the entrance air of the machine. At the same time two plates (Nos. 6 and 7) were exposed to the exit air. One of these plates developed 6 germs, and the other developed 7 germs.

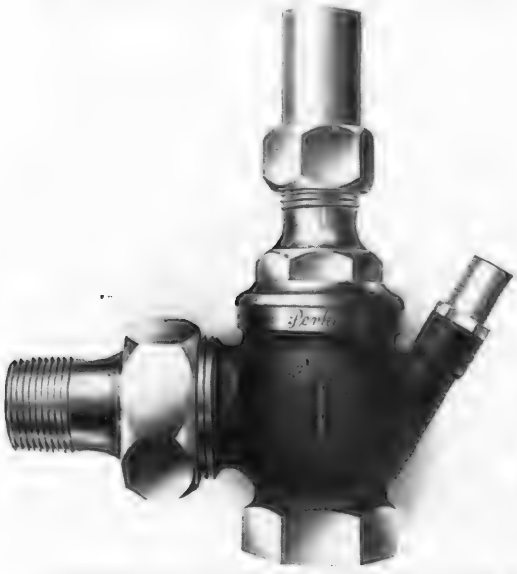
4. In order to show what the machine was really accomplishing, the water was now turned off, and the air passing through mingled with the dust. A little time was allowed to elapse in order that the inside of the machine should become somewhat dry, and then two plates (Nos. 8 and 9) were exposed to the exit air for 2 min. each. One plate (No. 8) developed one colony, and the other plate (No. 9) was entirely blackened by the dirt, which stuck to the surface of the glycerin-agar. The stream of air issuing from the exit pipe was visibly dust-laden, the objects in its path soon becoming covered with dirt. The explanation of the first plate remaining relatively free from dust and micro-organisms is probably due to the efficiency of the machine as an air purifier, when simply wet on the inside. This fact was noted in the case of the first test. The fact that plates 1, 2, 4, 5 and 7 contained practically the same number of micro-organisms, though exposed under very dissimilar circumstances, would indicate that possibly the contamination was acquired at the mouth of the exit tube rather than from the exit air itself.

5. A little later two more plates (Nos. 10 and 11) were exposed to the exit air while the water was running and while dust was being introduced into the entrance air. Plate 10 developed 33 colonies; plate 11, 16 colonies. The large number of colonies in these plates may have been due to dust having accumulated in the pipe, as the machine was running dry for some time. Owing to the fact that Plate 9 was so heavily loaded with dirt that it was impossible to count the colonies, another plate (No. 13) was exposed to the exit air, while the dust was being introduced and the water turned off. This plate was exposed to the air-current at about the time the machine was sufficiently dried out to allow some germs to come through, but no appreciable amount of dirt. It was exposed to the current ½ min., and about 70 colonies developed.

Four plates were poured, taken to Toledo, removed from their wrappings, but not opened. These served as controls, and all remained sterile.

The deductions drawn from the tests indicated the high efficiency of the air washer as installed.

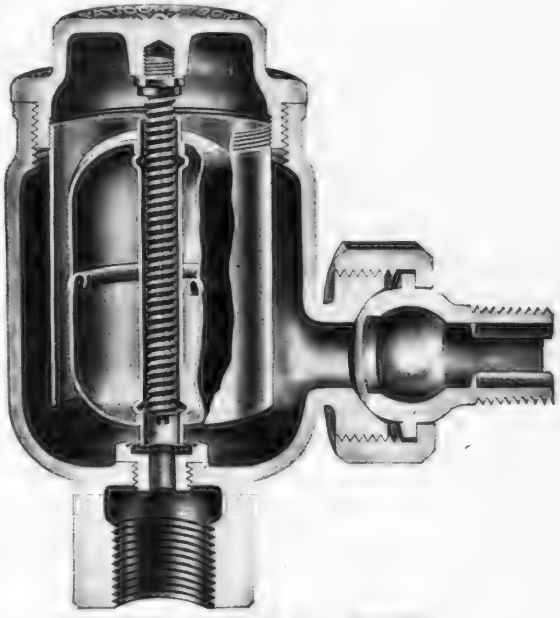
Perkes' Vacuum By-Pass Valve, Type D, manufactured by the Estate of Charles Perkes, 627-629 Arch street, Philadelphia, is described in a recent circular as providing a simple means of operating a vacuum steam heating system by gravity, as well as by vacuum, without changing the adjustment of the needle or vacuum



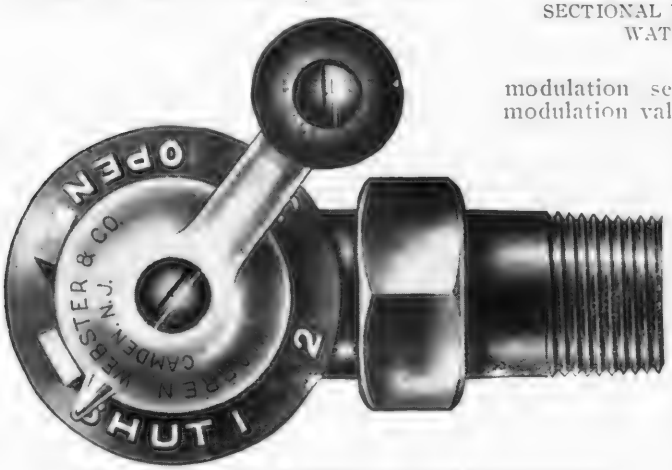
PERKES' VACUUM BY-PASS VALVE, TYPE D

orifice in the valve. The valve is easy to operate. After the room is warmed up in the morning, the main flow of steam to the radiator is turned off by closing the main valve and opening the by-pass outlet. This allows the condensation to be drawn off by the vacuum pump with the least amount of steam used for the balance of the day.

The Selection of a Heating System, a 16-page booklet, published by Warren Webster & Co., Camden, N. J., after presenting the general public's conception of a good heating system, "any collection of pipes, valves and fittings with a boiler at one end and a few radiators at the other," goes on to describe in detail the operation of the Webster Modulation System. Emphasis is laid on the fact that this is not a new system, but rather the extension of the principles of the Webster system of steam circulation to smaller buildings which do not need the more complex apparatus and greater attention required in large and extensive plants. The Webster modulation system is used with a two-pipe steam installation operated from an ordinary low pressure boiler, or from any other suitable source, at from ½ lb. to 1½ lbs. pressure, as a rule. There is no pressure in the return piping, which is open to the atmosphere. The principal appliances of a Webster

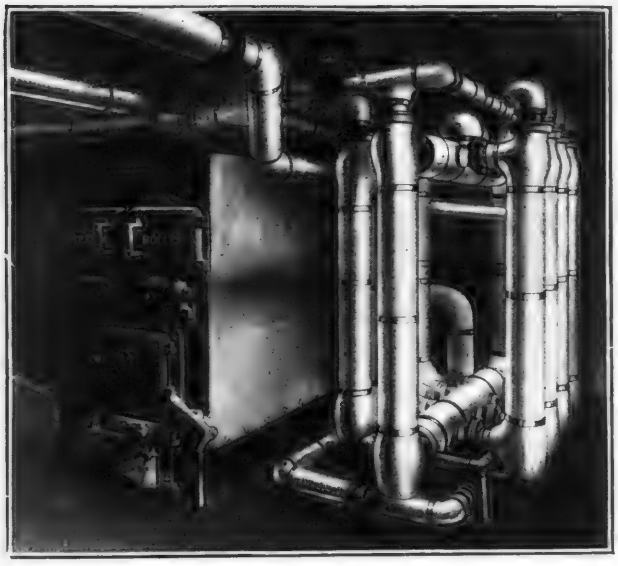


SECTIONAL VIEW OF THE WEBSTER WATER-SEAL MOTOR



TOP VIEW OF THE WEBSTER MODULATION VALVE

modulation set consist of a Webster modulation valve placed near the top of the radiator with an indexed dial showing the degrees of opening, and an automatic device, the Webster water-seal motor, taking the place of the usual valve at the return end of the radiator, which allows air and water only to escape. In addition, other specialties are furnished for the general operation of the system, such as a Webster damper regulator for regulating the



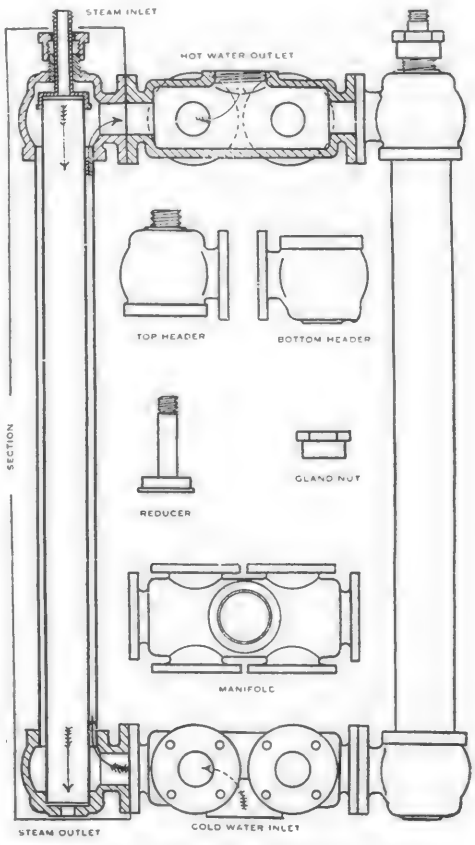
STEAM TRANSFORMER ATTACHED TO HOT WATER BOILER

boiler draft and the Webster special vent valve which prevents air entering the piping after once being expelled.

Detroit Transformer or Water Heater, made by the Central Station Steam Co., Detroit, Mich., is described in a newly issued catalogue as being a highly efficient apparatus for heating water with steam. Originally designed for district heating plants to make central station steam available in buildings equipped with a hot water heating system, the apparatus is now made for heating water in any building with either exhaust or live steam, up to a pressure of 100 lbs. It is claimed that with such an arrangement the care of the heating plant is much simplified, there being less fluctuations of temperature and less trouble and attention required. The transformer for an ordinary installation requires only a few square feet of space in the basement. The apparatus is especially useful in providing water storage for domestic purposes, being used in connection with a service tank. Examples are given in the catalogue, showing how to ascertain the size of transformer required for a given service, the capacities in stock ranging from 127 to 3,000 gals. of water heated per hour, or from 75 to 1,680 sq. ft. of direct hot water radiation supplied. Pp. 8. Size, 6 x 9 in. (standard).

Haines Vacuum Automatic Controller, for vacuum heating work, made by William S. Haines & Co., 136 South Fourth street, Philadelphia, is the subject of circular matter calling attention to the unique features of this valve. Emphasis is laid on the fact that it has no floats, the valve itself being controlled by a powerful tube spring which is operated by a change in temperature, either water or air. The one movable part consists of a crescent-shaped spring tempered steel tube, which contains a fluid, hermetically sealed. A change in temperature of one degree makes the tube open or close the valve.

American Electric Air Heaters and American Electric Luminous Radiators are interesting devices made by the American Electrical Heater Co., Detroit, Mich., and described in recent circulars. The electric luminous radiator corresponds to a portable fireplace without flame. Three large frosted lamps give out the heat. When the current is turned on they glow with a reddish yellow hue. Behind them is a copper reflector. In estimating the heat required to heat a given space, the allowance is made of 2 watts per cubic foot of air space.



DETROIT TRANSFORMER AND PARTS

TRADE AND MISCELLANEOUS NOTES

Miscellaneous Notes

American Foundrymen's Association and the American Brass Founders' Association will hold their next joint convention in Detroit, June 7-9, 1910. Headquarters will be at the Pontchartrain. The proceedings of the last joint convention have now been published.

Frank J. Corbett, formerly with the Ashton Valve Co., in charge of its New York office, has been appointed salesman for Manning, Maxwell & Moore, 85 Liberty street, New York. His line will include the brass goods made by the subsidiary companies of Manning, Maxwell & Moore.

Building operations for November compare very closely with those for November, 1908, in most sections of the country. In the eastern cities the increase was 9%; middle west, 9% decrease; southern cities, 41% increase; and Pacific Coast cities, 2½% increase. The figures for New York City were $11,530,370 for 1909, against $10,860,495 for November, 1908. Chicago showed a decrease, the figures for November, 1909, being $6,825,700, against $10,897,850 in 1908. One item in last year's figures was $4,500,000 for the terminal station of the Chicago & Northwestern Railroad.

Chicago, Ill.—The equipment of Chicago's street cars with ventilating devices in compliance with a recent ordinance has already led to charges of graft through the letting of the contract for the first 100 cars to the Acme Ventilating Co., of that city. The company's devices, it is claimed, made the third best showing in the preliminary tests. The company is under the control of the Chicago Fire Appliance Co., which has been under investigation by the Merriam Commission.

Marion, Iowa.—The Marion Light, Heat and Power Co. has been granted a 25-year extension of its franchise. The company reported an expenditure of $12,000 in remodeling its plant and pipe lines, and asked for an extension of its franchise in order to be able to float additional bonds.

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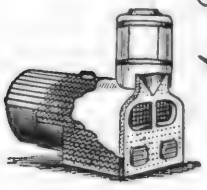

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ESTIMATES FURNISHED AND CONTRACTS EXECUTED.

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St. Louis, Mo.—Bids for the interior decoration and heating and ventilating of the Municipal Courts Building, at Marlet and Thirteenth streets, submitted early in December, were thrown out as being too high. The estimated cost of the work is $285,000, while the bids ran from $299,923 to $339,560.

Wallace E. Tillinghast, vice-president of the Sure Seal Heating Co., Worcester, Mass., has attracted much attention in the public press through his reported invention of an airship in which he is said to have sailed from Boston to New York and back again on the night of September 8. The construction of the airshi pas well as its location are carefully shrouded in mystery.

Toledo, O.—A proposed ordinance granting lighting and power rights to the Central Heating and Lighting Co. was tabled by the City Council after the company's representative refused to accept an amendment providing that the company must produce a bond of $10,000, to be forfeited in case the company failed to build the conduits within a year. The reason given for imposing this condition was that if no bond were fixed the company might be induced for a consideration by some other company to build no plant.

Guthrie, Okla.—Because State Commissioner Charles Daugherty would not consent to the employment of members of the International Association of Steamfitters and Helpers by A. F. Binns, of Oklahoma City, the latter lost his contract with the State Board of Affairs for the installation of a heating system in the insane asylum at Fort Supply.

Aberdeen, S. D.—The Aberdeen Mutual Service Co. has been organized by S. S. and George Gilborne and G. A. McLaughlin, the intention being to install a central heating plant large enough to furnish steam heat for a considerable number of buildings and residences. The City Council has been asked to grant a franchise, and the matter will be acted upon in January. Gilborne Bros. for some time past have been conducting a small heating plant on Lincoln street. It is proposed to greatly enlarge the capacity of this plant and to furnish steam for heating and power purposes to any part of the city. The rate as specified in the franchise is $1.25 per 1,000 ft. of meter condensation, with a minimum charge of $3.00 to each consumer.

Anderson, Ind.—A $500,000 steam heating plant that will reach to all parts of the business and residence sections of Anderson is proposed as a successor to the Home Heating Co.

Anderson, Ind.—The boards of school trustees and public work have secured estimates showing that a municipal steam heating plant to supply heat to several of the city's large school buildings can be installed for $40,000. Both boards are reported to be favorable to the project. It is proposed to take steam from the municipal water and electric light works. If the plan is consummated, Anderson will be the first city in Indiana to have a municipal heating plant for its school buildings.

Evansville, Ind.—Articles of incorporation have been filed and a franchise applied for by the Evansville Public Service Company, which will establish a central electric light, power, steam and hot water plant in Evansville. Options for a site have already been obtained by the newly formed company. In event of the franchise being granted, the maximum price of electricity, as stated in the franchise, will be 7½ cents, reduction of 25% from the present price. A central plant to supply the business district with steam heat and the residence sections with hot water heat will be established with the electric plant.

In return for this franchise, the life of which is to be 25 years, the city is to

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receive 50% of the net earnings of the company after a sum equal to 6% on the capital invested, a part of the expenses and a 4% depreciation fund have been deducted. The company is to be capitalized at $1,000,000. A bond of $20,000 is to be given the city before the work of construction is begun, and this bond is to be renewed annually. A majority of the stock is to be held by residents of Evansville.

Steam heat will be furnished, from September 15 until May 15, at meter rates of 60 cents per 50,000 lbs. to 50 cents for more than 100,000 lbs. of steam. This price is 10 cents cheaper than the rates charged by the Indianapolis central heating company.

United Bunch of Sheep, an organization of salesmen which was formed in Milwaukee a few years ago and which has spread to many cities in the central west, held its annual meeting December 17 at the St. Charles Hotel, Milwaukee, Wis. A Supreme Fold was organized, with the following officers: Supreme ram, James T. Getchum; supreme viceram, D. W. Johnson, Milwaukee; supreme past ram, J. F. Wulf, Milwaukee; supreme shepherd, A. P. Dease, Chicago; supreme shearer, Walter S. Rait, Chicago; supreme K. G. F., A. W. Magill,

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Chicago; supreme herder, N. B. Garnsey, Milwaukee; supreme bell sheep, J. W. Story, Chicago. A banquet which followed the installation of the officers was the occasion of much jollity and was a huge success.

William G. LeCompte, sales representative for Jenkins Bros., New York, was elected president of the National Exhibitors' Association at the last annual convention of the National Association of Stationary Engineers. The exhibitors' association takes care of all matters pertaining to the exhibits, and handles the money for the entertainment of the delegates and guests. Mr. LeCompte has made a notable record in this direction in connection with the entertainment provided during the conventions of the National Association of Master Steam and Hot Water Fitters.

Manufacturers' Notes

Ward & King, Ltd., Montreal, Que., prominent Canadian manufacturers of boilers and radiators, are reported to have sold their business, including their plant at Brantford, Ont., to the American Radiator Co. The company makes the Daisy line of boilers.

American Radiator Co., Chicago, announces that it has purchased the entire business and property of the Holland Radiator Co., of Chicago, and has taken over its assets and assumed its obligations. Under the direction of Mr. J. E. Holland, the organization of the Holland Radiator Co. for the conduct of this department of the American Radiator Co.'s business will be continued.

Joseph Dixon Crucible Co., Jersey City, N. J., announces the election of J. H. Schermerhorn as assistant secretary and assistant treasurer of the company.

Kewanee Boiler Co., Kewanee, Ill., has purchased a plot of land amounting to four acres to provide room for the enlargement of its boiler and radiator shops at Kewanee.

Rococo Boiler Co., Erie, Pa., is building a new plant at Erie. The company recently purchased the American Heater Mfg. Co. at West Chicago, Ill.

Union Radiator Co., Johnstown, Pa., is planning to increase the capacity of its plant by adding to its power equipment.

Pressed Radiator Co. of America, Pittsburg, Pa., announces the appointment of William A. Major as manager of its Philadelphia office at 230 Arch street. Mr. Major has long been identified with the trade, having been manager for 18 years of the James P. Wood Heating Co., of Philadelphia.

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PREFACE TO THE FIFTH EDITION.—The fifth edition has been corrected and so far as possible brought up to date. The part relating to the construction and use of the blowing fan has been largely rewritten. In preparing this revised edition the author has had the assistance of M. F. Thomas, M.M.E., who has had an extensive practical experience as a heating and ventilating engineer and who has made some notable investigations of the capacity and efficiency of various forms of blowing fans.

ITHACA, N. Y., November 1, 1909.

CONTENTS.—Nature and Properties of Heat. Principles of Ventilation. Amount of Heat Required for Warming. Heat Given off from Radiating Surfaces. Pipe and Fittings Used in Steam and Hot-Water Heating. Radiators and Heating Surfaces. Steam-Heating Boilers and Hot-Water Heaters. Settings and Appliances. Methods of Operating. Various Systems of Piping. Design of Steam and Hot-Water Systems. Heating with Exhaust Steam. Non-Gravity Return Systems. Heating with Hot Air. Mechanical Ventilators. Mechanical Systems of Heating and Ventilating. Heating with Electricity. Temperature Regulators. Schoolhouse Warming and Ventilation. Specification Proposals and Business Suggestions. APPENDIX.—Literature and References. Explanations of Tables. Tables. Index.

FOR SALE BY **The Heating and Ventilating Magazine,** 1123 Broadway New York

Peck-Williamson Co., Cincinnati, O., has bought out the R. S. Snyder Heating and Ventilating Co., of Rockford, Ill. The plant at Rockford will be continued in operation, and R. S. Snyder will continue as local manager of the Peck-Williamson Co.

Crane Co., Chicago, it is learned, is the purchaser of over 50 pieces of property near its plant at West Twelfth and Canal streets that have recently been sold. The company is planning large additions to its plant, the figures given approximating $1,000,000.

Seamless Pressed Steel Co., Dayton, O., it is reported will operate a plant for the manufacture of radiators and boilers at Redkey, Ind.

Crane Co., Chicago, has resumed work on the immense new plant at Oakmont, Pa., which was abruptly halted a few weeks ago. All connection with the Best Mfg. Co., of Pittsburg, has been terminated, and the plant when completed in the spring will be operated by the Crane Co. alone.

Best Mfg. Co., Pittsburg, Pa., announces that contracts have been awarded to the Lawrence Steel Construction Co., of Pittsburg, for the erection of two additions to its plant. The company's machine shop at Twenty-fifth street and Allegheny Valley R. R. will be enlarged by an addition 280 x 73 ft., and the foundry addition at Thirty-seventh street and Pittsburgh Junction R. R. will be 100 x 60 ft. The work will require an outlay of $50,000, exclusive of machinery and other equipment.

New Incorporations

Atlantic Radiator Co., Dover, Del., capital $150,000, to manufacture, sell and deal in radiators. Incorporators: Edward P. Harrington, New York; O. P. Simler, Tyrone, Pa.; and George T. Townsend, Wilmington, Del.

Pella Heating Co., Pella, Iowa. Capital stock, $10,000.

Puritan Electric Heater Co., Detroit, Mich. Capital stock, $25,000.

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George Steckel Plumbing & Heating Co., 101 Union street, Newark, N. J. Capital stock, $10,000. Incorporators: George Steckel, Howard Van Hise and Peter Bechtle.

Ohio Heating & Mfg. Co., Cleveland, O., capital $10,000, to manufacture heating specialties. Among the principal incorporators is George D. Hile.

Somerville Stove Works, Somerville, Mass., capital $125,000, to manufacture boilers, stoves and castings. Incorporators: Michael Baum, Charles L. Voorhees and James Q. Ten Eyck.

Zander Plumbing Supply Co., 77 Broadway, Buffalo, N. Y., capital $100,000, to conduct a jobbing business in heating and plumbing supplies. Incorporators: F. W. Zander, V. Cole and C. Kuhn.

Chicago & North Shore Plumbing & Heating Co., Chicago, capital $25,000, to do a general heating and plumbing contracting business. Incorporators: C. A. Lundberg, E. J. Saxe and F. S. McClory.

Northern Indiana Brass Foundry Co., Elkhart, Ind., capital $10,000, to manufacture brass fittings. Directors: C. G. Schweitzer, Sarah Schweitzer and V. E. Schlotterbach.

Northern States Power Co., Chicago, capital $10,000,000, to furnish gas and electricity for light, heat and power purposes. The company was incorporated in Dover, Del., December 23, by E. J. Graf, Matthew A. Morrison, Garrison Growvig, F. W. Sterns, all of Chicago; and Warren W. Aiken, of Wilmington, Del.

Hudson Vacuum Cleaner Co., 279 Grove street, Jersey City, N. J. Capital stock, $25,000. Incorporators: E. Elmdorf, Newark; Albert Higson and Frank T. Boyer, both of Jersey City.

Standard Heating Co., 800 Jefferson street, Hoboken, N. J., capital $20,000, to conduct a steam and hot water contracting business. Incorporators: Charles Schaff, Charles Schaff, Jr., and Fred Schaff.

Business Chances

Washington, D. C.—Sealed proposals will be received at the office of the Supervising Architect, Treasury Department, for the following-named work:

Until January 25, 1910, for the extension, remodeling, etc. (including plumbing, gas piping, heating apparatus, electric conduits and wiring), of the U. S. Post Office at Pawtucket, R. I.

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Method of Making Angle with Slotted Angle Flange.

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West Virginia Plumbing & Heating Co., Charleston, W. Va., heating and plumbing 12-story office building in that city for $18,000; also heating and plumbing the Robinson & Pritchard 10-story office building for $22,650.

Fairmont Plumbing Co., Fairmont, W. Va., heating and plumbing J. G. McCrory Co.'s building for $3,000.

Ahern Plumbing Co., Lexington, Ky., heating, plumbing and gas fitting new post office building at Paris, Ky., for $4,400.

Dakota Plumbing & Heating Co., Grand Forks, N. D., heating and plumbing new Schlaberg building on De Mers avenue for $4,000.

Charles Whitehead, Frankfort, Ky., heating and plumbing residence of W. E. Simmons, near Frankfort, for $10,000.

Walter P. Dunn, Newark, N. J., heating and plumbing $30,000 building at St. Benedict's College on High street.

Standard Plumbing & Supply Co., Morgantown, W. Va., steam heating and plumbing addition to Woodburn Hall at Universtiy, W. Va., for $3,500.

Illinois Plumbing & Heating Co., Chicago, heating and plumbing new Edwards School at Springfield, Ill. The heating work amounts to $7,788, and the plumbing to $2,648.

Collins Bros., Houston, Tex., heating and plumbing Hale county court house and jail for $6,456.

Bryce Heating Co., Mishawaka, Ind., heating new high school building at that place.

J. P. Bisenius, St. Cloud, Minn., steam heating and ventilating the Thursdale School building at that place for $1,600.

A. J. Andrews & Co., Louisville, Ky., heating plant for the State Normal and Industrial Institute at Frankfort. The lighting contracts went to Harry I. Wood & Co. and the Marine Electric Co. The heating and lighting work amounted to $15,000.

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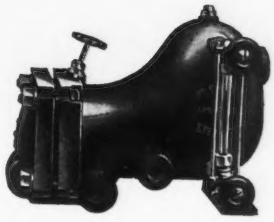

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C. C. Hartwell & Co., Vicksburg, Miss., remodeling the county court house steam heating plant for $2,780.

M. J. Gibbons, Dayton, O., heating system for the county infirmary at Dayton for $4,744. This is the third time the contract has been awarded to Mr. Gibbons, the work having been previously stopped by injunction proceedings brought by another bidder, the Ward-Lehman Co.

Machinery & Electrical Co., Los Angeles, Cal., steam heating Presbyterian church at Long Beach, Cal., for $4,000.

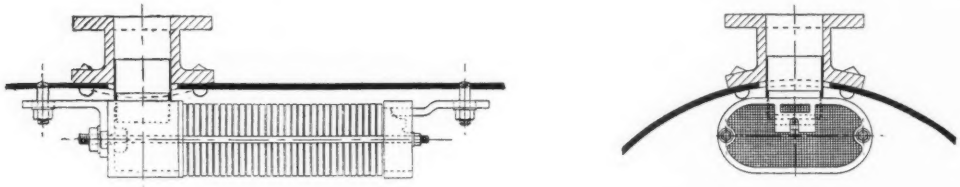
Lennig-Rapple Engineering Co., San Francisco, Cal., heating and ventilating new Hall of Justice for $28,692.

Trade Literature

Practical Books for Practical Men is the title of a 40-page catalogue issued by The Norman W. Henley Publishing Co., 132 Nassau street, New York. The books listed are all on scientific subjects, and embrace a wide range, including some 85 titles. Among the books of interest to heating and ventilating engineers are King's "Practical Steam and Hot Water Heating," Hiscox's "Modern Steam Engineering," and Booth's "Steam Pipes," besides a number on electrical subjects and on gas and other engines. The catalogue is sent free to those asking for it.

Ventilation by the Royal System is a profusely illustrated catalogue of the Royal line of ventilators, made by The Royal Ventilator & Mfg. Co., Philadelphia. "Points That Count" in favor of the Royal ventilator are stated to be its double cone, offering least resistance to natural or forced draft, its pointed bottom cone and its patented radiating ribs. The bottom cone is a special feature designed to accelerate the flow of air. In addition to the round types, views are included of Royal rectangular and square ventilators, all of which are made in a wide variety of sizes. A type that prevents accumulation of dust or dirt and at the same time reflects light into the building is known as the Royal glass top ventilator, and is equipped with damper, which can be closed, if desired. The catalogue, besides showing a number of large typical equipments, contains an impressive list of schoolhouse installations, and there is also a price list for sizes ranging from 2 in. or 4 sq. in. area up to 10 ft. or 11,309 sq. in. area. Pp. 64. Size, 6 x 9 in. (standard).

Potter Mesh Separators, made by the Potter Separator Co., Newburgh, N. Y., described as an absolute preventative of accident to the engine due to water shock, is the title of a newly issued catalogue showing photographs and sectional drawings of this well-known appliance. The Potter separator separates the moisture from the steam at the outlet of the boiler and delivers dry steam to the pipe. Its principle is shown to be entirely different from that of the "line" separator, with its reservoir of moisture, which may accidentally overflow and wreck the engine. The advantages of the Potter separator's construction are to be seen in its series of wire screens, each screen being placed between a pair of metal bands, supported by heavy end castings. The whole separator is bolted together and fitted to the steam outlet inside of the boiler. The separation of the moisture is accomplished by the passage of the moisture-laden steam through the series of screens. The views shown in the catalogue include a typical installation clearly showing this action. A partial list of users, together with some of the many testimonials received, indicate the wide use of the appliance. Pp. 16. Size, 6 x 9 in. (standard).



STANDARD SINGLE END POTTER SEPARATOR INSTALLED

Insulation of Pipes and Boilers is treated concisely but fully in a booklet published by the H. W. Johns-Manville Co., 100 William street, New York. The cover is a reproduction in half-tone of

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a properly insulated boiler plant. The various types of covering made by this firm are shown in broken photographic views, displaying the texture of the material. Steam conveyed a mile with practically no loss, engine rooms made 50° to 75° cooler, danger from fire from pipes eliminated, are some of the statements made, which are supported by the results of tests covering these points. A covering for every condition is to be found, it is stated, in the company's products, the types shown but partially covering the full line. Pp. 24. Size, 3½ x 6 in. (standard).

Standard Recording Thermometers, manufactured by the Standard Thermometer Co., 65 Shirley street, Boston, are the subject of an interesting circular calling attention to the importance of their use in a ventilating plant, the point being made that they bear the same relation to a ventilating plant that an indicator bears to a steam engine. Directions are included for setting up and using the recording thermometer, the type shown being listed at $25.00.

How 4 Cars Did the Work of 5 is the title of a pamphlet issued by the H. W. Johns-Manville Co., New York, in which the figures are presented for one year's operation of a steam plant before and after being insulated with Asbesto-Sponge felted covering for the pipes, and Vitribestos boiler covering for the boilers. With the ordinary high-pressure covering, 2,100 tons of coal were consumed, amounting, at $3.00 a ton, to $6,300. After the new covering had been applied, the record was 1,553 tons of coal, amounting, at $3.00 a ton, to $4,659. The saving thus effected was $1,641, or 26%.

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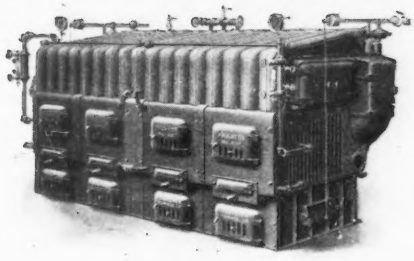

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